DOCUMENT RESUME

ED 353 808	FL 020 795

AUTHOR	Westphal, German F., Ed.; And Others
TITLE	ESCOL '91. Proceedings of the Eastern States Conference on Linguistics (8th, Baltimore, MD, October 11-13, 1991).
INSTITUTION	Ohio State Univ., Columbus.
REPORT NO	ISBN-1-878594-07-9
PUB DATE	92
NOTE	415p.
AVAILABLE FROM	ESCOL Publications Committee, Department of Linguistics, The Ohio State University, 222 Oxley Hall, 1712 Neil Ave., Columbus, OH 43210-1298 ($10 individuals, $12 institutions).
PUB TYPE	Collected Works - Conference Proceedings (021)
EDRS PRICE	MF01/PC17 Plus Postage.
DESCRIPTORS	American Indian Languages; Dutch; English; Foreign Countries; Grammar; Italian; Korean; Language Classification; Language Research; Latin; *Linguistics; *Linguistic Theory; Morphology (Languages); Regional Dialects; Sanskrit; Singhalese; Slavic Languages; Syntax; *Uncommonly Taught Languages
IDENTIFIERS	Huave; Icelandic; Mohawk

ABSTRACT

Papers delivered at the conference on linguistics include: "On the Metrical Unity of Latinate Affixes"; "Epistemic Small Clauses and Null Subjects"; "Scrambling as Non-Operator A'-Movement: Variable vs. Null Epithet"; "Polarity, Inversion, and Focus in English"; "Phrasal Input to Derivational Morphology in Slavic"; "Formal Grammar and the Acquisition of Complex Sentences"; "What to Focus in Sinhala"; "Syntactic Constraints on Temporal Representations: Evidence from Italian and Latin"; "Toward a Discourse Level Account of VP Ellipsis"; "Temporal Adverbs and the Structure of Reference and Event Points"; "What Does Conceptual Structure Have To Do with Syntactic Theory?"; "Meta-Templates & the Underlying (Dis-)Unity of Sanskrit Reduplication"; "'Anti-Internalization': Suppression and Projection of External Theta-Roles"; "Compensatory Lengthening in Korean Revisited"; "A Classification of VSO Languages"; "Stress and Accent in Abkhaz"; "When Nominals Are Predicates"; "Case and Licensing"; "Information Structure, Parameters, and Word Order"; "Clausal Adjuncts and Temporal Ambiguity"; "Tone and Stress in the San Mateo Dialect of Huave"; "Dative Compounding and the Prominence Theory of Theta Assignment"; "Crossing Coreference: No Evidence for Pronominalization"; "The Subset Principle and the Acquisition of the 'Long Distance' Reflexive sig in Icelandic"; "Reference Time Relations"; "Learnability and the Acquisition of Auxiliary and Copula 'be'"; "Constituent Structure Processing in Korean"; "Governed PRO and Finiteness"; "Appendices, Structure Preservation and the Strong Domain Hypothesis"; "Lexical Functional Distinctions in Mohawk Verb Agreement Morphology"; and "Expletive Raising and Expletive Replacement in Dutch." (MSE)

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Proceedings of the Eighth Eastern States Conference on Linguistics

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ESCOL '91

Proceedings of the Eighth
EASTERN STATES CONFERENCE ON LINGUISTICS

University of Maryland, Baltimore

October 11 - 13, 1991

Germán F. Westphal, UMB
Benjamin Ao, OSU
Hee-Rahk Chae, OSU

Editors

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ESCOL '91: Proceedings of the Eighth Eastern States Conference on Linguistics.

Cost per volume:	Individuals:	$10.00
	Institutions:	$12.00

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ESCOL Publications Committee
Department of Linguistics
The Ohio State University
222 Oxley Hall
1712 Neil Avenue
Columbus, Ohio, 43210-1298, USA

Checks or money orders should be made payable to: The Ohio State University.

ACKNOWLEDGEMENTS

This volume contains papers presented at the Eighth Annual Meeting of the Eastern States Conference on Linguistics (ESCOL'91) held at the University of Maryland, Baltimore, October 11-13, 1991. The conference was sponsored by the Department of Cognitive Science at Johns Hopkins University, the Department of Linguistics at the University of Maryland, College Park, and the Department of Modern Languages & Linguistics at the University of Maryland, Baltimore. Many people contributed to the success of this conference. Special thanks go to the following: Stephen R. Max, Acting Vice President of Research and Dean of the Graduate School, for facilitating all local arrangements at the University of Maryland, Baltimore; and Arthur O. Pittenger, Dean of Arts and Sciences, and Robert A. Sloane, Chair of the Department of Modern Languages & Linguistics, University of Maryland, Baltimore, for their grant contributions. The offices of David W. Lightfoot, Chair of the Department of Linguistics at the University of Maryland, College Park, and Brian D. Joseph, Chair of the Department of Linguistics at Ohio State University, also made grant contributions to the conference. The Department of Linguistics at Ohio State University merits special mention for undertaking the publication of the proceedings and maintaining the continuity of the conference since I organized the proto-ESCOL meeting in Indiana, Pennsylvania, in 1983.

The abstract selection committee was formed by Stephen R. Anderson, William Badecker, Luigi Burzio, Paul Gorrell, Norbert Hornstein, Omar Ka, David Lightfoot, Amy Weinberg, and myself. Of the 150 papers submitted for anonymous review, we were only able to place 29 on the program, with an acceptance rate of 19%. This volume includes all papers presented at the conference, except for "A Psycholinguistic Analysis of Unaccusativity in Spanish" by Thomas Bever, Itziar Laka & Montserrat Sanz, "How Does an Adult Know a Language?" by Wayne O'Neil, and "The Complexity of Anaphora" by Eric Ristad. Special thanks go to all authors who submitted abstracts to the conference. Also to the invited speakers, whose leading papers and participation were key to the success of ESCOL '91: Luigi Burzio, Peter W. Culicover, Ray Jackendoff, Alec Marantz and Wayne O'Neil. Finally, I would also like to thank the following, who kindly agreed to chair the conference sessions: Stephen R. Anderson, William Badecker, Luigi Burzio, Hector Campos, Thomas T. Field, Brian D. Joseph, Omar Ka, David W. Lightfoot, Alan Munn, Juan Uriagereka, Steven Young, and Raffaella Zanuttini.

Last, but not least, all ESCOL '91 authors and myself should be especially grateful to my co-editors, Benjamin Ao and Hee-Rahk Chae from the Department of Linguistics at Ohio State University, for undertaking the responsibility of managing all the details of the publication of this volume.

Germán F. Westphal
Conference Chair, 1991

TABLE OF CONTENTS

Burzio, Luigi*
On the Metrical Unity of Latinate Affixes 1

Cardinaletti, Anna & Maria Teresa Guasti
Epistemic Small Clauses and Null Subjects 23

Cho, Jai-Hyoung
Scrambling as Non-Operator A'-Movement: Variable vs. Null Epithet 34

Culicover, Peter W.*
Polarity, Inversion, and Focus in English 46

Fowler, George
Phrasal Input to Derivational Morphology in Slavic 69

Frank, Robert
Formal Grammar and the Acquisition of Complex Sentences 81

Gair, J.W. & L. Sumangala
What to Focus in Sinhala 93

Giorgi, Alessandra & Fabio Pianesi
Syntactic Constraints on Temporal Representations: Evidence from Italian and Latin 109

Hardt, Daniel
Towards a Discourse Level Account of VP Ellipsis 121

Inclán, Sara
Temporal Adverbs and the Structure of Reference and Event Points 130

Jackendoff, Ray*
What Does Conceptual Structure Have to Do with Syntactic Theory? 142

Janda, Richard & Brian Joseph
Meta-Templates & the Underlying (Dis-)Unity of Sanskrit Reduplication... 160

Jones, Charles
'Anti-Internalization': Suppression and Projection of External θ-Roles 174

Kang, Seok Keun
Compensatory Lengthening in Korean Revisited 186

Kaplan, Tami
A Classification of VSO Languages 198

Kathman, Dave
Stress and Accent in Abkhaz 210

Mandelbaum, Deborah
When Nominals Are Predicates 222

Marantz, Alec*
Case and Licensing 234

Merlo, Paola
Information Structure, Parameters, and Word Order 254

Munn, Alan
Clausal Adjuncts and Temporal Ambiguity 265

Noyer, Rolf
Tone and Stress in the San Mateo Dialect of Huave 277

Potter, Brian
Dative Compounding and the Prominence Theory of Theta Assignment 289

Rohrbacher, Bernhard
Crossing Coreference: No Evidence for Pronominalization 301

Sigurjónsdóttir, Sigrídur & Nina Hyams
The Subset Principle and the Acquisition
of the "Long Distance" Reflexive sig *in Icelandic* 313

Spejewski, Beverly & Greg N. Carlson
Reference Time Relations 325

Stromswold, Karin
Learnability and the Acquisition of Auxiliary and Copula be 335

Suh, Sungki
Constituent Structure Processing in Korean 347

Terzi, Arhonto
Governed PRO and Finiteness 359

Wiltshire, Caroline R.
Appendices, Structure Preservation and the Strong Domain Hypothesis 371

Wright, Martha
Lexical Functional Distinctions in Mohawk Verb Agreement Morphology .. 383

Zwart, C. Jan-Wouter
Expletive Raising and Expletive Replacement in Dutch 393

* invited speaker.

ESCOL '91 1-22

ON THE METRICAL UNITY OF LATINATE AFFIXES

Luigi Burzio
The Johns Hopkins University

1. Introduction

The Latinate subset of English suffixes breaks down into two subclasses, which I will refer to as Class I and Class II, following established terminology. The suffixes of Class I cause changes in the stress pattern, as illustrated in (1), where underscore identifies the stress of the unsuffixed stem.

(1) *CLASS I AFFIXES: Restressing*

a. -al: accidéntal, medícinal, oríginal, paréntal, prefíxal, pyrámidal, triúmphal, univérsal

b. -ic: linguístic, realístic, allérgic, oceánic, astronómic, gymnástic, homéric, idiótic, prophétic

c. -ion/ -ation: congregátion, consecrátion, demarcátion, insulátion, integrátion, intimidátion, affirmátion, allegátion, centralizátion, combinátion, compilátion

d. -ous: advantágeous, courágeous, outrágeous, incéstuous, moméntous, volúminous, ridículous, tempéstuous

In contrast, the suffixes of Class II generally preserve the stem stress, as in all the cases in (2).

(2) *CLASS II AFFIXES: Stress-neutral*

a. -able: accéptable, adáptable, affórdable, expándable, oppósable, refúndable, respéctable, surpássable, sustáinable

abólishable, álterable, ánswerable, chérishable, cólorable, delíverable, inhábitable, inhéritable, intérpretable, périshable

b. ist: pharmacólogist, perféctionist, empíricist, genéticist, románticist, extrémist, húmorist, propagándist, térrorist

américanist, cápitalist, géneralist, indivídualist, módernist, mónarchist

c. absentéism, alármism, deféatism, escápism, extrémism

módernism, mónarchism, cápitalism, féderalism, líberalism, líteralism, náturalism, rádicalism, américanism, fávoritism

d. ant/ ent/ ance/ ence: consúltant, contéstant, deféndant, depéndant, detérminant, expéctant, inhábitant, régistrant, reláxant, resístant, resúltant, vísitant, complíance, delíverance, inhéritance, resémblance, resístance, séverance, súfferance, absórbent, antecédent, coexístent, consístent, convérgent, depéndent, reminíscent, subsístent, transcéndent

e. *ment*: abándonment, accómplishment, achíevement, adváncement, améndment, beréavement, bombárdment, devélopment, embódiment, envélopment,

accómpaniment, góvernment, impóverishment

f. *ize*: propagándize, anthopomórphize, européanize, itálicize, románticize, compúterize, gélatinize, monópolize, revolútionize

cápitalize, munícipalize, famíliarize, pópularize, américanize

g. *-y*: félony, mátriarchy, mónarchy, bútchery, órthodoxy, áccuracy, conféderacy

In the past, from Chomsky and Halle's "SPE" to Halle and Kenstowicz (1991), stress neutrality has consistently been analyzed as a form of evasion of stress or immunity to the stress principles, though this idea has been implemented in different ways. In SPE, the distinction between the two classes was a difference in the type of boundary that the suffix occurs with. Class II suffixes were associated with a word boundary "#", while Class I had a morpheme boundary "+". The restressing character of Class I suffixes then followed from the fact that the stress rules reapplied at each successive "cycle", and had the power to alter previously assigned stresses. Neutrality, on the other hand, followed from the assumption that rules of word stress, while applying across morpheme boundaries, did not apply across *word* boundaries, hence leaving the stem unaffected by later cycles, as stated in (3).

(3) *Chomsky and Halle (1968) "SPE":*

i)	párent + al	stress rules reapply
ii)	américan # ist	stress rules fail to reapply

In Kiparsky's (1982) influential "Lexical Phonology" model, the distinction was not one of boundary type, but rather one of level of affixation in a sequentially organized derivation. Class I suffixes are in this system attached at "Level 1", followed by cyclic application of the stress rules, while Class II ones are attached at "Level 2", which is beyond the reach of the stress rules, as in (4).

(4) *Kiparsky (1982) "Lexical Phonology":*

i) Level 1 | Morphology: Class I affixation
| Phonology: Stress rules, ...

ii) Level 2 | Morphology: Class II affixation
| Phonology: ...

In the alternative model developed by Halle and his associates, which we refer to as "Cyclic Phonology", the Class I/ Class II distinction is not due to the different level of affixation, but rather to the different sets of rules that each class triggers. Class I suffixes have a lexical diacritic specifying that they are "cyclic", and as such trigger cyclic rules. In contrast, Class II suffixes are "non-cyclic", triggering only non-cyclic rules, which apply after all cyclic ones, only once per word. This schema is illustrated in (5).

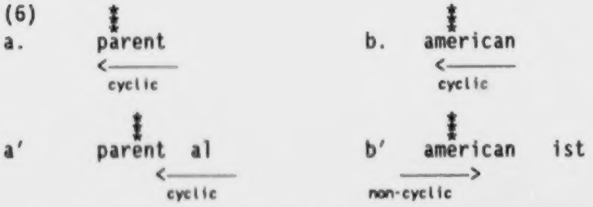
(5) *Halle and Vergnaud (1987a,b), Halle and Kenstowicz (1991) "Cyclic Phonology":*

i) Cyclic Phonology, triggered by cyclic affixes: Class I (main stress rules)

ii) Non-cyclic Phonology, triggered by NC affixes: Class II (other stress rules)

Note that the organization in (5) does not immediately account for stress-neutrality, unless the set of non-cyclic stress rules is taken to be null. In Halle and Vergnaud (1987a,b), this is not so, however, and the exact account of stress-neutrality is not made explicit. An explicit account of neutrality is given in Halle and Kenstowicz (1991) extending the general framework of Halle and Vergnaud (1987b). Their analyses are illustrated in the derivations in (6) below.

(6)

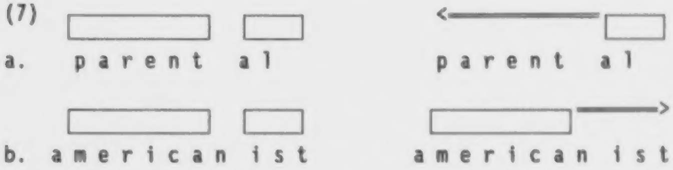


i) Cyclic rules: r-l parse; "Stress erasure convention"
ii) NC rules: l-r parse; "Crossover constraint"

In (6a), a first application of the cyclic stress rules, which apply right-to-left, parsing syllables into feet, results in the metrical grid given. In (6a′), a second application of the cyclic rules correspondingly results in the new grid. There is no preservation of earlier metrical structure here, because cyclic rules are associated with the "Stress Erasure Convention", which eliminates that structure at each new cycle. In (6b), the cycle is just as in (6a), but in (6b′) the suffix is non-cyclic, hence triggering the *non-cyclic* rules only. The latter are in fact presumed to be rather similar to their cyclic counterparts in overall composition, but with three crucial differences: i) non-cyclic rules parse the structure left-to-right (Halle and Kenstowicz′ innovation to the Halle and Vergnaud framework); ii) they are not associated with the Stress Erasure Convention; iii) they are subject to the "Crossover Constraint", which states that a parsing procedure cannot jump over pre-existing metrical structure. As a result of the conjunction of i) and iii), Class II suffixes, like *ist* in (6b′), remain unparsed, hence evading stress much as in earlier models. As a result of ii), the stem stress will surface unchanged.[1]

In this paper, I present an alternative account of stress-neutrality based on the hypothesis that neutral suffixes are subject to normal parsing into feet, like non-neutral ones, though two different modes of metrification distinguish the two classes. The structure of my proposal is schematically illustrated in (7) below. One important aspect of it is the assumption that metrical structure is part of the underlying representation of words, subject to output well-formedness conditions, that is the assumption that there is no stress-assignment, but rather stress-checking. I assume furthermore that there is a requirement that morphemes be metrically "consistent", that is that they surface with the same metrical structure to the extent possible, just as they tend toward consistency of segmental and semantic structures. Metrical consistency of both stem and suffix will occasionally be achievable. In the more general case, however, the two will be incompatible, hence requiring that either the stem or the suffix metrify in a new way, *in*consistent with other occurrences of the same morpheme. The proposed distinction between Class I and Class II is now that with Class I suffixes the suffix wins, imposing its own metrification on the stem, as in (7a), whereas with Class II suffixes the stem wins, forcing the suffix to metrify accordingly.

(7)



We will see later on that, from this perspective, it is in fact possible to predict which suffixes will behave which way. The main part of this paper is a collection of arguments for this approach and against any form of "stress evasion". If correct, those arguments will suggest that models of the lexicon or of the phonological component that have stress evasion as an available option are overly permissive in rather significant ways.

2. Analytical Framework

To make the proposal in (7) concrete, it will be necessary to introduce a certain amount of analytical machinery. This will be drawn from Burzio (1987), (1990), (1991), (in progress). We begin by considering the two well-known generalizations of English stress, as in (8) and (9).

(8) a. Heavy penultimate: agénda, appéndix, horízon

b. Antepenultimate: américa, ásterisk

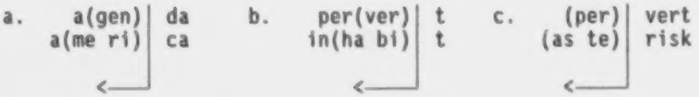
(9) a. Superheavy final: pervért, decíde

b. Penultimate: inhábit, imágine

The pattern in (8) is the one characteristic of nouns and suffixed adjectives, while that in (9) is characteristic of verbs and unsuffixed adjectives. The "super-heavy" syllables of (9a) are syllables whose structure exceeds that of normal heavy syllables by one consonant, while a heavy syllable is standardly defined as one that either ends in a consonant or has a long vowel.

In Hayes (1982), (1985) and much subsequent work, the two patterns in (8) and (9) are analyzed in terms of a single parsing algorithm, by supposing that English word ends are metrically ambiguous, in the sense that the parsing, proceeding right to left, can start at two different points in the structure. Specifically, Hayes has proposed that at the right edge of a word either a full syllable or a single consonant can be "extrametrical", namely ignored in the parsing, so that the parsing will then consistently construct either a monosyllabic foot (H) or a bisyllabic one (σL), where "H, L" stand for heavy and light syllables respectively. This approach, which has been very influential, is schematically summarized in (10).

(10) *After Hayes (1982), (1985):* Word-ends metrically ambiguous: ...)σ#/ ...)C#. Feet (H)/ (σL)



In Burzio (1987)-(in progress), I present a different approach. The latter maintains Hayes' intuition that there is a single parsing mechanism at work and that the difference between (8) and (9) is due to the ambiguity of word ends, but it implements it in a rather different way. A central assumption of that approach is that syllabification is in general free to parse phonetically empty structure beyond the visible edges of words. Given the well-known principle that requires consonants to syllabify as onsets whenever possible, that assumption will entail that final consonants will always be onsets, since they can be followed by a null vowel, in the manner of (11).

(11) per.vér.tø, in.há.bi.tø

On this hypothesis, there will thus never be truly "final" consonants, all English words ending in a vowel, overt or null. It is easy to see that this analysis now reduces the stress pattern of the items in (11) to the penultimate/ antepenultimate pattern of a.gén.da/ a.mé.ri.ca. More generally, it will reduce the pattern of (9) above to that of (8), as we see below. In addition, this hypothesis, which extends to other languages, accounts for the phenomenon of "super-heavy" syllables, and the fact noted by Hayes (1982, p.229) and otherwise unaccounted for, that in English and other languages "...superheavy syllables may occur only in ...final position...". On this view, all syllables are normal -- "superheavies" being sequences of two syllables, one with a null vowel. Their occurrence only peripherally reflects the distribution of null vowels. General motivation for Hayes' extrametricality disappears as well, since feet can now be taken to be uniformly binary (Hσ) or ternary (σLσ), as in (12). Further advantages for this approach are discussed in Burzio (in progress).

(12) *Burzio (in progress):* Feet (Hσ)/ (σLσ)

```
      a.   a(gen da)|              b.    per(ver tø)|
          a(me ri ca)|                  in(ha bi tø)|
                     |                              |
               <-----                         <-----
```

However, some notion of extrametricality is necessary in this approach as well, in order to handle nouns ending in a consonant (that is, a null vowel), in the manner illustrated in (13).

```
(13)       (per ver)| tø
        (as te ris)| kø
                   |
             <-----
```

Specifically, we must suppose that syllables with null vowels are metrically ambiguous, that is optionally extrametrical, much as syllables in general were optionally extrametrical in Hayes'

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framework. But consider now that the type of extrametricality invoked by (13) is in fact attested independently of the null-vowel hypothesis, with a certain class of special syllables that we refer to as "weak" (W). The class of weak syllables, in which we thus include those with null vowels, is illustrated in (14).

(14) *-Metrical ambiguity of "weak syllables": ...* W)#/ ...)W#
-W class: ø, y, ive, ure, [son]

a. per(ver tø) / (per ver)tø
b. an(ti pa thy) / (ef fi ca)cy
c. ob(jec tive) / (ad jec)tive
d. ad(ven ture) / (a per)ture, (tem pe ra) ture
e. a(pos tle) / (ve ge ta)ble
f. de(cem ber) / (cha rac)ter

The extrametricality of the right-hand examples in (14b-f) is essentially "theory neutral". That is, it must be postulated in any theory that takes the basic generalizations of English to be as in (8) and (9). The reason is that the stress pattern here exceeds those generalizations by one syllable. In particular, the extrametricality of (14b-f) must thus be postulated in Hayes' theory as well, and -crucially- in addition to Hayes' normal extrametricality, as for example in (effi)<ca>[cy], where "<>" is the normal extrametricality of Hayes' system, and "[]" the extrametricality of this special class of syllables. Our system in (12) thus accounts for the two patterns in (8) and (9) by minimally extending the extrametricality needed for (14b-f) to the case in (14a), whereas the system in (10) does so by introducing unrelated machinery. As shown by (14), weak syllables are then syllables with null vowels, syllables with the high vowel corresponding to orthographic y, syllables ive and ure, and syllables with sonorant nuclei. As discussed in Burzio (1991), (in progress), I presume, -albeit tentatively- that the distinguishing characteristic of weak syllables is in fact acoustic weakness, their metrical behavior then reflecting the general alignment of metrical structure and acoustic prominence.

Weak syllables have another property beside the ability to be extrametrical. When they are metrified as part of a binary foot (Hσ), that foot, which we will refer to also as "weak", fails to attract primary stress, as illustrated in (15a-f), which describes the same spectrum of weak syllables as (14a-f).

(15) *Weak Foot:* (σ W)

a. bérnar (dÈ nø) b. cóntro (vèr sy) c. ínno (vÀ tive)

d. árchi (tèc ture) e. táber (nà cle) f. álli (gÀ tor)

We interpret the phenomenon of weak feet as also related to the actual, namely acoustic, weakness of weak syllables. Weak feet are presumed to be acoustically weak because they are structurally minimal, namely binary, and they also incorporate a weak syllable. Primary stress in English is then taken to fall on the rightmost foot which is not weak --the latter restriction resulting again from the general alignment of stress and acoustic prominence.

3. *Stress Neutrality and Weak Syllables*

We are now ready to make the proposal in (7) above more concrete. Specifically, we propose, as in (16) below that stress-neutrality is a by-product of the rather general ambiguity of word-ends in English, alias the double option of metrification or non-metrification of final weak syllables.

(16) Stress-neutrality results from the ambiguity of word ends,
namely *...)W/* versus *...W)*.

Assuming then as in (7b) above that with neutral suffixes the stem "wins", we consider the cases in (17) to see how suffixes can be integrated into the metrical structure of the stem under the thesis in (16).

(17) a. ac(cép tø) b. propa(gán da) c. a(mé ri ca)nø
ac(cép ta)ble propa(gán dis)tø a(mé ri ca)(nis tø)

The case in (16a) is rather straightforward. Here, the first syllable of the suffix *able* supplants the final syllable of the stem *accept* (i.e. the null vowel), while its second syllable *ble* --a weak syllable (compare (14e)) is allowed to remain extrametrical. As a result, the rightmost foot of *acceptable* is identical to the one of *accept*, whence the identical stress. The case in (17b) is rather similar, as the first syllable of the suffix also supplants the final one of the stem, while the second syllable of the suffix, being again weak, remains extrametrical. The case in (16c) is a bit different, since here none of the suffix can be incorporated into the final foot of the stem. But the other option available to weak syllables can be resorted to. By metrifying that syllable, the suffix will form a separate foot of its own, still leaving the preceding one undisturbed. This of course predicts a stress on *ist*, but only a secondary one, due to the weak foot. The primary stress is then correctly predicted on its stem position. Note that while perceptual evidence does not independently support the view that *ist* in (17c) has a secondary stress, it is nonetheless compatible with it. For perceptual prominence of syllables with secondary stresses appears to be rather systematically non-distinct from that of unstressed heavy syllables with unreduced vowels.[2]

We will see later on that the type of account of stress-neutrality illustrated in (17) and based on the ambiguity of weak syllables can be upheld in all cases.[3] One might ask, however, why the same ambiguity should not suffice more generally, yielding neutrality with all suffixes that end in a weak syllable, incorrectly. We will see that there is a principled answer to this question, but in the meantime we may consider the following as a preliminary account. Let us suppose that Class I suffixes are lexically specified as having metrically unambiguous ends, specifically by means of a foot boundary which either includes or excludes the final weak syllable depending on the suffix, as in (18).

(18) Non-neutral suffixes are specified with unambiguous ends:
a)l•, ic•), ou)s•, ...

a. (pá ren)t• pa(rén ta)l•	b. (lín guis)t• lin(guís ti c•)	c. (mó men)t• mo(mén tou)s•
a′ (pý ra mi)d• py(rá mi da)l•	b′ (hóme)r• ho(méric•)	c′ (rí di cu)le ri(dí cu lou)s•

Note that comparable markings seem required in any theory, so as to distinguish for instance al or ous, which place stress according to the pattern in (8) above, from ic, which follows the pattern in (9), placing stress always on the immediately preceding syllable, as (18) shows. In our analysis, the same, independently needed, diacritic will also serve to distinguish non-neutral suffixes from neutral ones. The latter will simply lack the diacritic.

4. Arguments against Stress-evasion

We now turn to the arguments for our approach, and specifically for (16) above, and against stress-evasion. The evidence considered will concern Latinate suffixes only, and those in (2a-g) in particular. The thesis in (16) is thus defended here only relative to Latinate suffixes, leaving open the question of the nature of the neutrality of Germanic suffixes like less, ness, ful, ly. See Burzio (in progress), however, for arguments that the latter does not consist of stress evasion either.

4.1 Bound Stems

The first of our arguments is that the two metrifications needed to account for stress-neutrality under (16), namely one including and the other excluding a final weak syllable (or the equivalent options handling (8) vs. (9) in other theories) are independently needed to account for occurrence of the same suffixes with bound stems, where there is presumably no issue of neutrality. This is shown by (19), where the left and mid columns instantiate non-metrification, and the right-hand one metrification of the weak syllable. The diacritic "•" indicates existence of other variants. (Unmetrified, non-orthographic null vowels are not indicated).

(19)	(σ L σ) W	(H σ) W	(...W)
a.	inde(fatiga)ble, in(domita)ble, in(dubita)ble, i(nequita)ble, i(nevita)ble, i(nexora)ble, in(supera)ble, (misera)ble, (verita)ble, (vulnera)ble,	ine(lucta)ble, de(lecta)ble	•hos(pitable)
b.	an(tagonis)t, mi(sogynis)t, pro(tagonis)t, re(cidivis)t	perio(dontis)t, obscu(rantis)t, ana(baptis)t	(solip)(sist•), ob(scuran)(tist•), •(systema)(tist•)
c.	a(nachronis)m, an(tagonis)m, me(tabolis)m, ven(triloquis)m, as(tigmatis)m		(solip)(sism•), (ecume)(nism•), (malapro)(pism•), (syner)(gism•)
d.	con(comitan)t, ex(travagan)t, e(xuberan)t, pro(tuberan)t,	be(nignan)t, re(dundan)t, re(pugnan)t, re(luctan)t, in(dignan)t,	
e.	ex(perimen)t, me(dicamen)t, pre(dicamen)t,	com(partmen)t, com(portmen)t, de(partmen)t, em(bankmen)t, in(stalmen)t	(tempera)(ment•)
f.			an(tago)(nize), me(tabo)(lize)
g.[4]	(effica)cy, (appeten)cy, (casual)ty,	(amnes)ty, (dynas)ty, (infan)try,	e(conomy), a(natomy), a(nomaly),

(aller)gy,
(liber)ty,
(ener)gy,
(litur)gy,
(lethar)gy,
(calum)ny,
(majes)ty,
(proper)ty,
(pover)ty,
(caval)ry

(indus)try,

pe(riphery),
(taxy)(dermy),
(metal)(lurgy),
(cere)(mony)
(acri)(mony),
(ali)(mony),
(contro)(versy),
(cata)(lepsy),
as(sembly)
an(tipathy),
al(lotropy)

Note that the left and mid columns in (19b,d,e) instantiate normal metrification for items of these classes, i.e. nouns and suffixed adjectives, while the right-hand column in (19b,c,e), correspond to a metrification attested but rarer with these classes, and more typical of verbs. As could be shown by considering a larger sample of cases, the instances on the right are in fact less numerous than the others, so that the facts in (19) are on the whole rather unremarkable, paralleling those of underived items, or items with Class I suffixes.[5]

While the stress-neutral behavior of these suffixes thus reduces to their behavior with bound stems, one might attept to uphold the opposite, and suppose that bound stems, just like free ones, involve an internal "cycle", as well as a neutral suffix. While this move is logically possible, it seems of rather limited plausibility, however. If we consider that the intuition about stress-neutrality is that, in saying, e.g. propagándist, speakers in a sense also say propagánda, surely there is no sense in which in saying antágonist one is also saying *antágon.

Supposing then that suffixes in (19) are normally parsed into feet, we conclude that stress evasion is superfluous as an account of neutrality of the same suffixes, since the two different types of parsing attested in (19) in fact suffice.

4.2. Exceptions to Neutrality

The second of our arguments is that only the thesis in (16) correctly predicts certain cases of non-neutrality, such as those in (20).

(20) a. (dócu)(mèntø) => (dòcu)(ménta)ble

b. circumvéntable, impleméntable, recompénsable, interchángeable, maniféstable, ascertáinable, reconcílable, extradítable, realízable, criticízable, recognízable, utilízable, oxydízable, generalízable, diagnósable, prosecútable, executable, substitútable, cultivátable, regulátable, manipulátable

The verb document in (20a) exhibits the normal metrification of verbs, incorporating the null vowel. However, because the final foot is weak (and there is another foot preceding it) that foot will predictably only bear secondary stress. When able is attached, the structure of the final foot will be preserved as usual, just as in (17a) above. Here, however, the final foot of the adjective is no longer a weak one, since the a of able does not constitute a weak syllable. Primary stress is then correctly predicted to shift to the final foot.[6] The cases in (20b), in which underscore marks the stem primary, are all analogous to (20a), as are the ones in (21).

(21) a. (ánec)(dòte) => (ànec)(dótist•)
[like: o̲pportúnist, me̲tallúrgist]

b. (máni)(fèst•) => (màni)(féstan)t

c. (áduer)(tÌze) => •(àdver)(tÍzemen)t

The cases in (22) are also rather similar.

(22) a. (prótes)t => pro(tésta)ble

b. (trÍum)ph => trI(úmphan)t

c. (rémedy) => re(mÉdia)ble

d. •(súrvey) => sur(véya)ble

e. (lúxury) => lu(xúrian)ce

f. (módifY) => (mòdi)(fÍa)ble

g. (tránslA)te => trans(lÁta)ble

h. •(ímpreg)(nÀte) => im(prégna)ble

The left-hand forms in (22a-g) all have the stress pattern of nouns ((8) above) for various reasons, some idiosyncratic. When a suffix like able is attached to such a metrical structure, neutrality cannot be achieved, as we see in more detail in 4.6 below, whence the stress shifts in (a,c,d,f,g). The shifts of (22b,e) follow in analogous fashion from the fact that ant/ ance, appear with only one metrification, as in (19d) and as noted in fn.5 (hence like al and ous of (18)). This enables these suffixes to be neutral in the same manner as able when attached to verbs, but not in these cases. Finally, the case in (22h) involves attachment of able to a verb in ate via truncation of the latter morpheme. Neutrality cannot be achieved in this case because the resulting structure *(impregna)ble would instantiate an ill-formed foot *(σHσ).

In sum, the stress shifts of (20)-(22) are entirely predictable from the assumption that the suffixes are metrified. In contrast, within a stress-evasion account of neutrality there would be no reason for this curious set of exceptions.

4.3. Vowel Shortening

Our third argument is based on the fact illustrated in (23) that Latinate Class II suffixes occur in a considerable number of cases in which stem vowels have shortened, such as those on the left contrasting with those on the right, in which stem vowels remain long.

(23) *Vowel Shortening with Class II Suffixes*

a. able

(admira)ble, (compara)ble,	oppOsable, refUtable,
•(cogniza)ble, •(repara)ble,	restOrable,
ir(repara)ble, •(refuta)ble,	rest of: ...Izable
ir(revoca)ble	

b. ant/ ent/ ance/ ence

(aspiran)t, (ignoran)t,	•adhErent, persevErance,
•(excitan)t, (cognizan)t,	endUrance, dispUtant,
cla(rifican)t, sig(nifican)t,	disappEarance, pollUtant,
(abstinen)t, (confiden)t,	•excItant
co(inciden)t, (presiden)t,	
(residen)t, (preceden)t	

c. ment

(chastizmen)t, •ad(vertizmen)t	acquIrement, •advertIzment,
(incremen)t, (excremen)t	cajOlement, replAcement,
	engAgement, confInement,
	appEasement, agrEement,
	advIsement

d. y/ ist

te(lephony)/ist,	expIry, allegOrist,
me(troscopy)/ist, (hypnotis)t,	•archIvist, •prIvacy,
•(archivis)t, •(allegoris)t,	encyclopEdist, escApist,
(milita)(rist•), (satiris)t,	extrEmist, manicUrist

e. ism

(semi)(tism), (rabbi)(nism)	extrEmism
(milita)(rism•),	
(prosely)(tism•),	
in(fantilis)m, (albinis)m,	
(philisti)(nism•)	

f. Ize

(allego)(rIze), (milita)(rIze), (sati)(rIze), (immu)(nIze), (prosely)(tIze), •(concre)(tIze), (oxy)(dIze)	•concrEtIze

The argument is provided by the fact that, when stem vowels shorten, stress is correctly predicted only by metrification of the suffix, in the manner indicated by the analyses, and not by neutrality, which holds only for the right-hand examples. The examples in (24) below show that such shortening of stem vowels is a general property of Latinate affixation, extending to Class I suffixes, as in (24a-d) where we note the familiar variation between left-hand and right-hand examples, as well as to prefixes, as in (24e).

(24) *Vowel Shortening with Class I Suffixes/ Prefixes*

a. al

vaginal, antipodal, centrifugal, horizontal,	...cIdal, anecdOtal, caricatUral

b. ous/ y

infamous/y, carnivorous, blasphemous/y, •decorous, gangrenous, monotonous/y	desIrous, •decOrous

c. age

concubinage

d. ation

....ization	....Ization

e. prefixes

pIous	->	impious
fAmous		infamous/y
fInIte		infinite
•repArable		irreparable
pOtent		omnipotent
vAlent		univalent
cYcle		bIcycle
vOcal		univocal
sEquent/ce		subsequent
mIgrant		immigrant

In Burzio (1991), (in progress), I propose a unified analysis of the shortening of (23)-(24), which we may refer to as "morphological shortening" and other instances of shortening, in particular the "trisyllabic" shortening of e.g. *divIne*/ *divinity*. I argue that the apparent idiosyncratic variation of the morphological shortening in (23)-(24) compared with the more systematic character of trisyllabic shortening follows from extrinsic principles of metrical theory, specifically the principle of metrical consistency alluded to in 1. above. In the cases in (23)-(24) metrical consistency of the stem or "stress preservation" can be achieved only if shortening does not occur. The variation can then be interpreted as satisfaction of either contending requirement: shortening as in the left column, or stress preservation as in the right column. In contrast, trisyllabic cases like *di(vinity)* satisfy both shortening and stress preservation simultaneously, as the resulting metrical structure is well-formed, like that of e.g. *a(merica)*. On this view, the only difference between morphological shortening and "trisyllabic" shortening is the position in which the shortened vowel happens to be: either in the penultimate or in the antepenultimate syllable. It is therefore a completely general fact that Latinate affixes induce shortening of stem vowels. The question of the exact nature of morphological shortening is, however, only of general interest. The specific issue at hand is why it should be incompatible with stress-neutrality, as in (23). The thesis in (16) provides an immediate answer: neither metrification, nor non-metrification of the final weak syllable can guarantee stress-preservation, as shown in (25).

(25) a. *as(piran)t / *as(pirantø),
b. *tele(phonis)t/ *tele(phonistø)
c. *hyp(notis)t / *hyp(notistø)
d. *mili(tarI)ze / *mili(tarIze)
e. *ad(mira)ble / *ad(mirable)
e′ *blas(phemou)s/ *blas(phemousø)

In (25), all left-hand cases instantiate ill-formed feet **(Lσ)*, while the right-hand ones in (a-d) instantiate equally ill-formed feet *(σHσ)*. The case in (25e) **ad(mirable)* should, however, be well-formed, since the first syllable of the suffix is light, yielding *(σLσ)*. Note here that some cases with that structure are in fact attested, such as *di(visible)*, *des(picable)*. In general, however, *ble* remains extrametrical. The reason for this is metrical consistency. As we see in more detail in 4.6, neutrality of *able*, unlike that of *ist* (but like that of *ant*) does not generally invoke metrification of the final weak syllable, being systematically achieved by *non*-metrification. This is due to the fact that (like *ant*) *able* is attached primarily to verbs. The metrification *a)ble* is thus preferred under consistency, excluding *ad(mirable)* in (25e), just as consistency of the metrification *ou)s* excludes *blas(phemousø)* in (25e).

In contrast to the above account, there is no particular reason why, if the suffixes in (23) can evade stress, they could not continue to do so when they trigger morphological shortening. An attempt to capture the correlation between shortening and non-neutrality within past analyses would run as in (26):

(26) "Morphological" shortening is a "level 1/ cyclic" rule. When they trigger it, all suffixes must be "level 1/ cyclic", whence their non-neutrality in the shortening cases. Class II suffixes are therefore systematically ambiguous: either "level 1/ cyclic", thus triggering shortening, or "level 2/ non-cyclic", thus being neutral.

The account in (26) is not tenable, however. The reason is that Class II suffixes are never non-neutral when there is no vowel shortening (except in the cases of 4.2, already accounted for). For consider that Level 1/ cyclic classification will imply metrification of the suffix. Suppose now that metrification of the suffix in turn implied non-neutrality, as with Class I suffixes. Then, since morphological shortening is unsystematic with Level 1/ cyclic suffixes (witness (24)), there should be instances in which suffixes like ist are non-neutral and yet there is no shortening. This is not the case. Suppose instead that metrification of the suffix did not imply non-neutrality, but was rather consistent with neutrality. The hypothesis in (26) would now avoid falsification. But, if stress-neutrality can result from metrification, there is no point in postulating stress-evasion ever. The facts in (23), (24) thus lead to the conclusion that stress-evasion is either false or superfluous.

4.4. Suffix Size

A fourth argument against stress-evasion is that no stress-neutral suffix is larger that a weak foot. This fact follows immediately from (16). For any structure larger than a weak foot will necessarily contain a strong foot, bearing primary stress, hence excluding neutrality. In contrast, there is no reason why stress-evasion should be applicable only to suffixes of a particular size. Relevant suffixes here are not very numerous, but they all support our claim. Thus, átion, ólogy, ómeter are all non-neutral, bearing primary stress as predicted.

4.5. Parametric Variation

A fifth argument is that only (16) above correctly predicts that languages whose word ends are not ambiguous in the way postulated for English should not have stress-neutral suffixes. In particular, the thesis in (16) correctly predicts the clustering of properties in (27) distinguishing English from Italian, by taking the relevant parameter to be existence of weak syllables.

(27) Parameter: ± Weak Syllables	English (+)	Italian (-)
a. Stress patterns: 1 vs.2	(hones)tø ro(bustø)	o(nesto) ro(busto)
b. Stress "neutral" suffixes: ±	américanistø	americanísta
c. Weak Feet: ±	bérnar(dine)	bèrnar(dína)

Non-existence of weak syllables in Italian, independently predicted for syllables with null vowels by the fact that Italian words end in overt vowels, will predict a single stress pattern as in (27a), in contrast to the two of English ((8) vs. (9) above). Given (16) above, it will then predict the absence of stress-neutral affixes, as in (27b), as well as the general absence of weak feet, as in (27c). On the traditional view that a subset of the Latinate affixes in English can evade stress, it would be completely accidental that Italian should never avail itself of that option.

4.6. Predictability of Stress-neutrality

Our sixth and final argument is that only the thesis in (16) can in fact predict which English suffixes will be neutral and which will not. Here, let us suppose that the principle of metrical consistency imposes consistency of the stem, alias "neutrality", over suffix consistency, putting aside the exact reasons for the moment. In (28), (a) is thus ranked over (b).

(28) a. Stem Consistency

b. Suffix Consistency

The ranking in (28) thus predicts that any suffix that can be neutral will, satisfying (28a), while those that cannot will satisfy (28b) instead, we presume by fixing the position of the rightmost foot boundary in lexical representation in the manner of (18) above. What we then need to do is consider each possible structural combination of stem and suffix and determine whether or not it can achieve neutrality under the hypothesis in (16). This is a relatively simple exercise.

We begin by noting, as in (29) below, that most English suffixes end in a weak syllable (with a null vowel, or other), and furthermore that most are either monosyllabic or bisyllabic.

(29) a. Most English suffixes end in a weak syllable (underscored):

-i cø, -a lø, -i ty, -is tø, -a ble

b. Most English suffixes are monosyllabic or bisyllabic.

We put aside the few cases that do not conform with (29a), such as _-fy_, discussed in fn.3, which would not affect our point. We also put aside the few suffixes like _ation_, _ology_, _ometer_, which do not conform with (29b), whose behavior has already been accounted for. Under the conjunction of (29a,b) all relevant suffixes will then reduce to the three structures in (30).

(30) a. -W b. -L W c. -H W

Considering how suffixes combine with stems, we make the further observation that suffixes are generally either concatenated with the stem externally to its final foot, as in (31a), or overlapped with that foot by one syllable, as in (31b).

```
(31)  a.  concatenation: a(merica)n•            -> americanist
                                  |    is.t•
                                  └<───┘
      b.  σ-overlap:     propa(gan da)          -> propagandist
                                   |   is.t•
                                   └<──┘
```

The combination of (30) and (31) will now yield six logical possibilities to consider. Since clearly stress neutrality results when the rightmost foot boundary of the stem is preserved hence allowing all preceding metrical structure to remain intact (recall (17) above), we need only consider the effects of suffixation on that boundary for each of the six possibilities. This is done in (32).

(32)	concat.	σ-overlap	neutral?	
a. -W	...) W	...W)	always	ly, (y, er, or...)
b. -L W	* ...) L W	...L) W	if overl.	able, ic, al, ity,.
c. -H W	...)(H W)	...H) W	always	ist, Ize, ment, ...

In (32a), the suffix consists of a single weak syllable. When that syllable is attached by concatenation, the resulting structure is well formed, because a weak syllable can be extrametrical. If that same syllable is attached under overlap, the structure is still well-formed, since weak syllables can also be metrified. The prediction is therefore that all suffixes that are of this form should be neutral. This seems correct: nominal, adjectival and diminutive _y_ (_presidency_, _sugary_, _Billy_) are all neutral, as are agentive and comparative _er_ and agentive _or_ (syllables with sonorant nuclei). Turning to (32b), the sequence _LW_ cannot be neutral when attached by concatenation, because it can neither be extrametrical, nor be metrified as a separate foot (by (12) above), thus requiring that the rightmost foot boundary of the stem be reset. In contrast, when that sequence is attached by overlap, neutrality will result, because the weak syllable can remain extrametrical. The ensuing prediction seems again correct: suffixes able, ic, al, ity all have the structure in question, but only able is neutral. The reason is that only able is attached by overlap. In turn, this is due to the fact that only able attaches to verbs, which metrify a final null vowel, replaced by the a of able. Note too that the sequence al, non-neutral as an adjectival suffix attached to nouns, is in fact neutral just like able when attached to verbs, as in perúse -> perúsal, etc., just as expected.[7] [8] Finally, suffixes with the structure HW are predicted to be always neutral, as in (32c). When they are concatenated, they can stand as an independent foot in the manner of (17c) above. When attached by overlap they can leave the weak syllable extrametrical. Again, this seems correct, as ist, ize, ant, ment are all neutral.[9]

We can now return to (28a,b) and consider why stem consistency, alias stress-neutrality, should be preferred to suffix-consistency. If we suppose that lexical organization incorporates a principle of "economy", requiring maximal re-use of existing structures including metrical structure (as already implicit in the noted "consistency" effects), then it will be a simple numerical fact that stress-neutrality satisfies that principle to a greater degree than suffix- consistency. The reason is that for each individual suffix there are at most two possible metrical structures: one including and one excluding the final weak syllable, while there are many more stems. So, inconsistency of an individual suffix, as in is)t$_\emptyset$/ ist$_\emptyset$), versus consistent a)l$_\emptyset$ will entail an increase in the number of metrical structures by exactly one. In contrast, inconsistency of the corresponding stems will entail a much larger increase, like the one found with al in áccident/ accidéntal, médicine/ medícinal, órigin/ oríginal, and so forth. That is, the increase here will be by a number approaching the number of stems the suffix takes, while not quite reaching that number, as not all stems ever need to remetrify (e.g. cláuse/ cláusal). Hence, "economy", or maximal preservation, in fact predicts that (28a) should have priority over (28b) as we supposed, and in turn that all suffixes that can be neutral will be, as we have seen is the case.

5. Conclusion

In this article, I have presented an analysis of the stress-neutrality of Latinate suffixes like able, ist and others, that departs significantly from past analyses all of which, in various different forms, implemented the notion that these suffixes evade the stress principles. Specifically, I have argued that stress-neutrality of Latinate suffixes results from integration of the suffix into the metrical structure of the stem, and that the latter is made systematically possible, although only under certain structural conditions, by the general metrical ambiguity of word-

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ends --a language-specific property of English. I have given six arguments to support the latter analysis and refute the stress-evasion hypothesis, summarized in (33).

(33) i) Stress-evasion is superfluous, since the metrifications needed by occurrence of the same suffixes with bound stems suffice to account for neutrality.

ii) Only metrification and not stress-evasion correctly predicts certain classes of exceptions to neutrality.

iii) Only metrification correctly predicts that when stem vowels shorten stress-neutrality will no longer obtain.

iv) Only metrification correctly predicts that no neutral suffix will have a syllabic structure larger than a weak foot.

v) Only reliance on the ambiguity of weak syllables correctly predicts that a language that does not have weak syllables will not have stress-neutral suffixes.

vi) Only metrification correctly predicts which suffixes can be stress-neutral and which cannot.

FOOTNOTES

1. The SPE solution would seem the most parsimonious, since it only employs one lexical diacritic to draw the distinction between the two classes. The other accounts also mark the distinction with a lexical diacritic, but in addition postulate two different sets of rules.

The motivation for the left-to-right parse of Halle and Kenstowicz (1991) is in part to more naturally account for the initial stress and apparent ternary foot of cases like *(winnepes)sáukee*. We argue in Burzio (in progress) that the need to postulate special devices for this class of cases, including the left-to-right parse, is a contingency of an incorrect foot typology that excludes ternary feet. Note that in the system we propose below in the text and in Burzio (in progress), directionality of parsing plays no role, since stress is not assigned by rule. The differences across languages commonly attributed to directionality of parsing must therefore be expressed differently, and can.

2. For instance, the final syllables of *syllabify* and *organize* compare in perceptual prominence despite the fact that final stress is present only in the latter item, as we see in the next footnote.

3. This predicts that vowel-ending suffixes should not be stress-neutral. The prediction is correct, as shown by the behavior of *fy*, non-neutral in *ácid*/ *a(cídify)*, *húmid*/ *hu(mídify)*, *pérson*/ *per(sónify)*, *sólid*/ *so(lídify)*. The correct stress pattern of items in *fy* thus follows from supposing (contrary to past analyses) that three is no secondary stress on *fy*, which in turn is consistent with the fact that syllabification will not induce a null vowel here. A secondary stress would predict **(ácidi)(fy)*/... **(sólidi)(fy)* on par with, e.g. *a(mérica)(nize)*, *(óxyge)(nate)*, in which both *ize* and *ate* are neutral as predicted.

The null-vowel hypothesis thus predicts that in general vowel-ending verbs should exhibit the stress patterns of nouns ((8) above)), which is largely correct (note also *rémedy*), though cases like *agrée* require further comment as does -independently- *kangaróo*.

4. Note that the items *(aller)gy* through *(caval)ry* in (19g) seem deviant with respect to the foot types postulated in (12) above, in that they instantiate binary feet *(LH)*. As we note in Burzio (in progress) this kind of foot is in fact generally possible, but only word-initially, that is when a larger foot cannot be constructed for lack of syllables. This qualification does not affect the rest of the discussion.

5. We may also note that *ant* in (19d) appears only as *an)tσ*, while in (19f) *ize* appears only as *ize)*. For the former case, it is easy to show, however, that its stress neutral behavior also only requires that single metrification [as in *con(súltan)t*, etc. See also discussion of (25) below]. For the case of *ize*, however, a handful of neutral cases will in fact require the alternative *i)ze* [like *propa(gandi)ze*]. Hence, the claim that the metrification needed for bound stems suffices to account for neutrality under (16) is not completely true if made relative to each individual suffix, in particular not true for *ize*. It is nonetheless true for all other individual suffixes, and for the suffixes taken as a group.

6. There is, however, dialectal variation. For some speakers there is no stress-shift in these cases. The exact account of this variation is not immediately obvious.

7. There are, however, further restrictions not accounted for by the text. In particular, the stem is generally required to be *oxytonic*, with a few exceptions, like *bury*/ *burial*.

8. It is important to note that stress neutrality could still be achieved even with suffixes of the type *LW* attached by concatenation, whenever the final foot of the stem has the structure *(Hσ)*, in the manner illustrated in (i).

(i) (H σ) L W => (H σ L) W

This is not the case, however, as shown by (tIta)n -> *(tItani)c, and many other examples. This fact requires that we interpret (28) to mean that stem consistency is preferred over suffix consistency, not with respect to individual occurrences of a suffix, but rather only for the suffix as a whole. That is, stem consistency/neutrality will obtain only if the suffix can guarantee it with all stems. If not, suffix consistency will obtain instead. We are thus supposing that a suffix is marked for suffix consistency in the manner of (18) above, unless the absence of such marking guarantees full scale neutrality. Once the lexical marking is present, the suffix will observe it, yielding non-neutrality even in cases in which the latter could have been achieved in the manner of (i).

9. Although we have seen that ant (/ent, ance, ence) are essentially only attached by overlap (i.e. to verbs).

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ESCOL '91 23-33

EPISTEMIC SMALL CLAUSES AND NULL SUBJECTS

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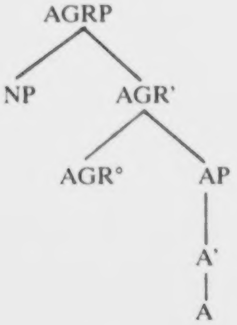
This paper provides evidence for the idea that the structure of adjectival small clauses includes an inflectional projection, as suggested by Belletti (1990) and Hornstein & Lightfoot (1987), among others. This projection is an AGReement Phrase, as shown in the representation in (1). The AGR head contains the agreement morphology and takes an AP as complement.

(1)



The hypothesis depicted in (1) will be shown to have far reaching consequences for the licensing conditions of an expletive **pro** of the type exhibited by the Italian example in (2).

(2) Ritengo [**pro** probabile che Gianni venga]
(I) believe (it) likely that Gianni comes

This proposal allows us to account for the distribution of **pro** in Romance and Germanic languages. Moreover, it induces a revision of the formal licensing condition for **pro**.

1. Agreement on small clause predicates

Looking at languages like Italian and French, it turns out that the predicate of a small clause manifests agreement with the subject of predication. This is shown in (3) and (4).

(3) Considero [queste ragazze soddisfatte del loro lavoro]
(4) Je considère [ces filles satisfaites de leur travail]
(I) consider these girls satisfied-FEM-PL with their work

Based on the far reaching idea that inflectional affixation takes place in the syntax (Baker, 1988; Belletti, 1990; Pollock, 1989), a view which goes back to Chomsky (1957), we interpret the presence of morphological agreement on the predicate in (3) and (4) as a hint that small clauses include an agreement projection. As for the nature of this Agreement, we propose that small clauses contain an AGROP (agreement with the object phrase), on a par with the agreement phrase found with past participles, according to Belletti (1990). This agreement head is different from the one present in full clauses. The crucial distinction lies in the presence vs absence of person features. Small clause predicates manifest number and gender features, but crucially no person features. We take this as evidence that in small clauses, contrary to full clauses, there is no AGRSP (agreement with the subject phrase). Furthermore, there is evidence that small clauses do not include any other functional projection, such as tense and negation (for relevant discussion, the reader is referred to Guasti & Cardinaletti, 1991).

2. Expletive null subject in epistemic small clauses

In this section, we are going to show that the hypothesis presented in § 1 offers a natural explanation for the cross-linguistic distribution of **pro** in small clauses. More precisely, we claim that it is AGRO°, the head of the AGROP, that licenses **pro** as illustrated in (2), repeated in (5).

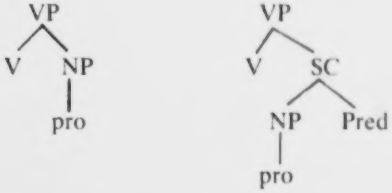
(5) Ritengo [$_{\text{AGROP}}$ **pro** probabile che Gianni venga]
(I) believe (it) likely that Gianni comes

In this respect, we differ from Rizzi (1986), according to whom **pro** in (5) is licensed by the matrix verb. However, we agree on Rizzi's general theory of **pro**. According to this, null pronominals must meet two requirements: they must be formally licensed and identified. Formal licensing is sufficient for non-argumental **pros**, i.e. expletive **pros**. The identification requirement must be fulfilled in the case of an argumental **pro**. Rizzi's definitions are reported in (6) and (7).

(6) **pro** is governed by a Case assigning X°
(7) (argumental) **pro** has the grammatical specification of the features on X°.

Let us start by reviewing the main lines of Rizzi's analysis of sentences like (5). According to him, the availability of null subjects in small clauses depends on the positive setting of what may be called the "null object parameter". This means that if in a language the verb is able to license a null object, it will also have the capacity of licensing a null expletive subject in the specifier position of its small clause complement. The relevant environments are given in (8) a/b.

(8) a b



This correlation correctly predicts the contrast between Italian and French on one side and English on the other. Italian and French have null objects as shown in (9)a and (10)a (cf. Authier, 1988; Roberge, 1988). In compliance with Rizzi's prediction, epistemic small clauses in these languages also display null subjects. This is illustrated in (9)b and (10)b.

(9) a Questo porta **pro** [a concludere quanto segue]
This leads (one) to conclude what follows
b Ritengo [$_{sc}$ **pro** probabile che Gianni arrivi in ritardo]
I believe (it) likely that Gianni will arrive late

(10) a Ceci pousse **pro** [à conclure ce qui suit]
b Je crois [$_{sc}$ **pro** probable que Jean arrive en retard]

In English, verbs do not license a null object, as proven by the ungrammaticality of (11)a. As expected, they do not license a null subject in their small clause complements, as in (11)b.

(11) a This leads ***pro**/people to conclude what follows
b I believe [$_{sc}$ ***pro**/it likely that John will come late]

In summary, if a language has null objects, it should also allow null subjects within epistemic small clauses.

3. Some empirical problems

Although appealing, Rizzi's correlation displayed in (8)a/b is empirically inadequate when the comparison is extended to German. Differently from English, null objects are available in German as shown in Cardinaletti (1990) and Grewendorf (1989). The relevant example is given in (12)a. Contrary to expectation null subjects are not possible in small clauses and the lexical expletive **es** is required, similarly to English, as shown in (12)b.

(12) a Das schöne Wetter regt **pro** an, zu bleiben
The nice weather induces to stay
b Ich finde [$_{sc}$ ***pro**/es unwahrscheinlich, daß er kommt]
I believe it unlikely that he comes

That the two phenomena, namely null objects and null subjects of small clauses, should be kept apart is corroborated by Rumanian and Icelandic. These languages exhibit the reverse situation with respect to the one manifested by German. While null objects are impossible as shown in (13)a and (14)a, small clauses display null subjects, as in (13)b and (14)b.

(13) a *Acest artist fotografiază **pro** goi
This artist photographs naked
b Consider [$_{sc}$ **pro** probabil că Ion să vină]
(I) consider (it) likely that Ion comes
(14) a Thetta leidhir ***pro**/fólk til adh draga eftirfarandi ályktun
This leads people to draw the following conclusion
b Eg tel [$_{sc}$ **pro** ólíklegt adh Jón muni koma]
(I) consider (it) likely that Ion comes

Sentences (13)a and (14)a indicate that the verb in Rumanian and Icelandic is not able to license a null object. If the matrix verb were the licenser of the null subject of a small clause, as Rizzi claims, sentences (13)b and (14)b should be ungrammatical, on a par with their English counterpart in (11)b.

The paradigm displayed by Rumanian and Icelandic on the one hand and by German on the other challenges Rizzi's correlation by showing that languages may have null objects without admitting null subjects in small clauses and viceversa. In what follows, we develop a different analysis which can cope with the problems raised by the patterns discussed above.

4. On the licensing of pro in small clauses

As far as null objects are concerned, we adopt Rizzi's hypothesis, according to which these are licensed by the governing verb. As for null subjects of small clauses, as in (5), we propose that the licenser is not the governing verb, but rather a head internal to the small clause, namely the AGRO°.

We adopt an idea developed by Cardinaletti (1990), Rizzi & Roberts (1989) and Roberts (1991) according to which **pro** can be formally licensed either in a configuration of Spec-head agreement or under government, in a way which parallels the configurations of Case assignment (Koopman & Sportiche, 1991). The conditions in (15) represent a revision of the formal licensing scheme in (6).

(15) **pro** must be formally licensed by an X° either via
i) Spec-head agreement or
ii) Government

These premises lead us to make our proposal more precise by saying that the subject of a small clause is licensed by the AGRO° in a configuration of Spec-head agreement.

This proposal allows us to account for the crosslinguistic distribution of **pro** in epistemic small clauses. In analogy with the licensing of null subjects in full clauses, the availability of null subjects in small clauses hinges on the "richness" of the licensing head. As said in § 1, the predicate of a small clause, similarly to the one of a full clause, may manifest overt agreement features, specifically number and gender agreement. It is this property that plays a role in the licensing of **pro**.

In English and German, no agreement morphology is ever displayed on the predicate of a small clause. The relevant patterns are given in (16)a/b and (17)a/b.

(16) a I consider this book interesting
b I consider these books interesting(*s)
(17) a Ich finde dieses Buch interessant
b Ich finde diese Bücher interessant(*e)

We take this as a hint that AGRO° is poor in these languages and does not qualify as a licensing head. As expected, null subjects are not present in small clauses. This accounts for the ungrammaticality of the English and German variants with **pro** in (11)b and (12)b above. As the examples show, all these sentences are grammatical when a lexical expletive is present.

On the other hand, Italian, French, Rumanian and Icelandic predicates display agreement. This is illustrated in (18), (19), (20) and (21)a/b.

(18) a Ritengo quest**a** alliev**a** molto preparat**a**
(I) consider this student well prepared-FEM-SG

b Ritengo quest**e** alliev**e** molto preparat**e**
(I) consider these students well prepared-FEM-PL

(19) a Je trouve **cette** maison très bien repeinte
I find this house very well painted-FEM-SG
b Je trouve **ces** maison**s** très bien repeinte**s**
I find these houses very well painted-FEM-PL
(20) a Îl consider inteligent pe acest baiat
(I) it consider inteligent-MASC-SG PE this boy
b Le consider inteligent**e** pe acest**e** fete
(I) them consider inteligent-FEM-PL PE these girls
(21) a Vidh toldum hann full**an**
We believed him drunk-MASC
b Vidh toldum hana full**a**
We believed her drunk-FEM

We interpret the morphological agreement as a manifestation of rich AGRO°. Under this view, the availability of null subject in small clauses is not surprising: AGRO° qualifies as a licensing head for **pro** in examples such as (9)b, (10)b, (13)b and (14)b.[1]

5. Case assignment in small clauses

We have assumed so far that AGRO° qualifies as the formal licenser of the null subject of a small clause. Under Rizzi's definition in (6), the formal licenser also assigns Case to **pro**. Although this is generally true, it does not seem to hold in the case under investigation. It seems reasonable to suppose that it is not AGRO°, but the matrix verb which assigns accusative Case to the specifier position of its small clause complement. This can be easily proven by the examples in (22) and (23) from French and German:

(22) Je **le** considère intelligent
I him-ACC believe intelligent
(23) Ich finde **den Studenten** intelligent
I find the-ACC student-ACC intelligent

This leads us to a partial reformulation of formal licensing along the following lines. Although we maintain that **pro** must occur in a configuration of structural Case assignment, we propose that the two operations of formal licensing and of Case assignment can be performed by different heads, as argued for by Guasti, (1989) and Roberts, (1991). AGRO° is the formal licenser, whereas the matrix verb is the Case assigner. This leads us to further revise the formal licensing conditions in (15) as in (24).[2]

(24) **pro** must be formally licensed by an X° either via
i) Spec-head agreement or
ii) government
in a **position** of structural Case assignment.

6. On the lack of argumental null subjects in small clauses

Notice that all the examples discussed so far include expletive **pro**s. As a matter of fact, this is the only type of null subject found in small clauses. Neither referential nor arbitrary **pro**s can be licensed in (25) and (26).

(25) *Ritengo [$_{\text{AGROP}}$ **pro**$_{\text{arg}}$ simpatico]
(I) believe (him) nice-MASC-SG
(26) *In questo paese ritengo [$_{\text{AGROP}}$ **pro**$_{\text{arb}}$ felici]
In this country (I) believe (people) happy-MASC-PL

The ungrammaticality of these sentences should not be attributed to the lack of formal licensing, since this is clearly met as in the sentences containing expletive **pro**. Rather, it is due to the failure of identification. Although the small clause predicate has number features, it does not have the person feature which is crucially necessary for the recovery of referential **pro** (see Borer, 1989; Rizzi, 1986). This explains the ungrammaticality of (25).

As for the impossibility of an arbitrary **pro** in (26), we offer the following tentative solution which is based on observations concerning other occurrences of arbitrary null subjects. Arbitrary subjects, differently from arbitrary objects, seem to be licensed by a head which potentially can have person features. One case is exemplified by Italian **si** constructions discussed by Cinque (1988), as in (27)a/b and another is represented by third person plural in (28).

(27) a **pro**$_{\text{arb}}$ si lavora molto
b **pro**$_{\text{arb}}$ si è lavorato molto
SI works/worked a lot
(28) **pro**$_{\text{arb}}$ hanno bussato
(They) have knocked

If person features are relevant in some sense for the licensing of an arbitrary interpretation, the unavailability of arbitrary **pro** in adjectival small clauses can be attributed to the nature of the licenser. As said above, the AGRO° included in a small clause is never affected by person features. Therefore, it cannot qualify as an identifier of an occurrence of arbitrary **pro**.[3]

7. Causative small clauses

There is a final issue that deserves discussion and this is represented by the availability of arbitrary **pro** in causative small clauses, as discussed in Rizzi (1986:533).

(29) Talvolta la stampa lascia [**pro**$_{arb}$ perplessi]
Sometimes the press causes (people) to remain puzzled

The possibility of **pro**$_{arb}$ in (29) contrasts with what we have just seen in epistemic small clauses. To accommodate this difference, we adopt Rizzi's (1986) solution and assume that the predicate of causative small clauses undergoes reanalysis (Rouveret & Vergnaud, 1980), forming with the matrix verb a complex predicate. In this way, the embedded subject becomes an argument of the complex predicate. This gives the result that the availability of an arbitrary **pro** in these contexts does not depend on the agreement head of the small clause, but on the matrix verb. The correlation in (8)a/b, that we have called the null object parameter, now holds. If in a language a verb has in general the ability to license a **pro**, this capacity will be inherited by the complex predicate formed by reanalysis. This predicts that causative small clauses with arbitrary **pro** should be available in languages such as French, German, which have null objects, and should be impossible in English, Rumanian and Icelandic, where a null object is never licensed. This expectation is borne out, as shown by the examples below.

(30) a Cette musique rend heureux
b L'entraînement maintient sains
(31) a Diese Musik macht glücklich
b Diese Decke hält warm
This blanket keeps warm
(32) a *This music makes happy
b *Jogging keeps healthy
(33) a *Aceasta face fericiti
This makes happy
b *Alergarea nu mentine sanatosi
Jogging NEG keeps healthy
(34) a *Thetta gerir gladhan
This makes happy
b *Thessi aefing heldur heilbrigdhum
This exercise keeps healthy

8. Conclusions

We have argued that adjectival small clauses are not simply the projection of a lexical head, but they include a functional projection which we have identified with AGROP. Based on this hypothesis, we have claimed that the null expletive in epistemic small clauses of the type in (5) is licensed by the AGRO° head. In this respect, our proposal differs from Rizzi's (1986). In his system, provided that a verb is able to license a null object, it has also the capacity of licensing a null expletive subject in the specifier position of its small clause complement. This is, however, empirically inaccurate when we consider languages such as German, Icelandic and Rumanian. German has null objects, but does not have null expletive subjects in epistemic small clauses, whereas Icelandic and Rumanian display the opposite situation. The investigation of the distribution of **pro** in small clauses has lead us to examine and to partially revise the licensing conditions for **pro**.

FOOTNOTES

*. We are grateful to Adriana Belletti, Guglielmo Cinque and Andrea Moro for helpful discussions; to Virginia Motapanyane for help with Rumanian data and to Hoski Sigurdhsson for help with Icelandic data. We would also like to thank the audience and the organizers of ESCOL (1991). Although every part of the paper has been written together, Anna Cardinaletti takes responsability of sections 1, 3, 5, 7 and Maria Teresa Guasti of sections 2, 4, 6, 8.

1. Our hypothesis makes the correct predictions for Norwegian (Arild Hestvik, p.c.). However, it seems **prima facie** problematic when extended to another Mainland Scandinavian language, such as Danish (Sten Vikner, p.c.). Although in this language, the adjectival predicate manifests agreement, a null expletive subject is not allowed in small clauses. These facts suggest that a refinement of the notion of 'rich' AGRO° is necessary, probably along the lines proposed by Roberts (1991) for AGRS°.

2. As in full clauses, null and lexical expletives are in complementary distribution. In English and in German, an expletive **pro** is impossible an a lexical expletive is required, in Italian, French, Rumanian the opposite situation holds.

i) *__Lo__ ritengo probabile che Gianni arrivi
ii) *Je **le** crois probable que Jean arrive
iii) *Îl consider probabil că Ion să vină
I consider it likely that Ion comes

Icelandic appears to provide a counterexample. The lexical element *thadh* (it), is marginally available, as shown by sentence (iv), in spite of the fact that **pro** is licensed (cf. example (14)b in the text).

iv) ?Ég tel thadh ólíklegt adh Jón muni koma
I consider it unlikely that Ion comes

However, sentence (iv) does not represent a real counterexample, since it displays a general property of Germanic languages. In fact, *thadh* can be analyzed not as an expletive, but as an argument, on a par with lexical pronouns coindexed with an extraposed clause found in other Germanic languages, such as Dutch and German (cf. respectively, Bennis, 1986 and Cardinaletti, 1990).

3. Given that arbitrary interpretation is conditioned by tense, in a rather complex way, one may envisage an alternative hypothesis, which would have the advantage of providing a unified account for object and subject arbitrary **pro**. This alternative would amount to saying that only a head related to tense is able to recover the content of an arbitrary **pro**. A way to obtain this could be by Verb-movement. The combination between the licensing head and tense achieved by Verb-movement is a condition on the interpretation and not on formal licensing. A head must be intrinsically able to formally license **pro**. If this proves to be the correct line of thinking, we can easily explain why an arbitrary **pro** is excluded from small clauses. As discussed in Guasti & Cardinaletti (1991) small clauses lack a tense projection. Hence, the content recovery strategy will fail. This approach differs from Authier (1988), which represents an attempt to reduce the availability of an arbitrary **pro** to Verb-movement. The main reason is that, in languages such as Rumanian and Icelandic, null objects are not attested, as we have widely discussed in the text, despite of the fact that Verb-movement takes place as argued for respectively by Motapanyane (1991) and Holmberg & Platzack (1989).

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ESCOL '91 34-45

SCRAMBLING AS NON-OPERATOR A′-MOVEMENT: VARIABLE VS. NULL EPITHET

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0. Introduction*

There have been some debates on the nature of scrambling, or the landing site of scrambling, in such languages as Korean, Japanese, Hindi and German. Under the VP-internal subject hypothesis that the subject is generated VP-internally (Koopman & Sportiche (1987) and Diesing (1988), among others), Kuroda (1988) proposes that scrambling in Japanese can take place as movement to the spec position of IP. Assuming that the subject is base-generated VP-internally and the IP structure has articulated AGR phrases (Chomsky (1989) and Pollock (1989)), Mahajan (1989) argues that scrambling in Hindi can be an instance of A-movement to the SPEC of IP or AgrP, or A′-movement to an IP-adjoined position. On the other hand, Saito (1989) claims that scrambling as A′-movement does not create a semantically significant operator-variable relation, in contrast to English Topicalization or Wh-movement. Independently, Webelhuth (1989) also suggests that scrambling is uniformly an adjunction operation, and the adjunction position is neither an argument (A-) nor an operator position.

In particular, Mahajan's (1989) observation that clause internal scrambling in Hindi, as a case of A-movement, does not trigger Weak Crossover (WCO) effects has posed a problem for the assumption that scrambling as A′-movement leaves behind a variable, triggering a WCO violation. The purpose of this paper is to provide a solution for the problem brought up by Mahajan by suggesting that scrambling, as movement to a non-operator A′-position, creates *a null epithet*, proposed in Lasnik & Stowell (1991), and thus it does not induce WCO effects, whereas Wh-movement and Quantifier Raising (QR) exhibit WCO effects since they create a true variable.

1. Scrambling and WCO

1.1. Clause Internal Scrambling and WCO. In order to account for WCO effects in this paper, I assume the following constraint:

(1) Weak Crossover Constraint
When a pronoun P and a variable V are both A'-bound by the same Quantifier Q, V must c-command P (See Reinhart (1976) and Lasnik & Stowell (1991)).

The constraint (1) can be schematized as in (2):

(2) * [Op_i [.. [.. $pronoun_i$ ..] .. t_i ..]]
where neither the pronoun nor the variable c-commands the other.

Since Saito and Hoji (1983) argued for the existence of a VP node in Japanese based on WCO phenomena, it has been maintained that WCO effects do exist in Korean (Hong (1985) and Choe (1988), among others). The following example is a typical case of WCO in Korean:

(3) a. * ku$_i$ -uy sensayng -i etten haksayng$_i$-ul sileha-ni?
he Gen teacher Nom which student Acc dislike-Q
'His$_i$ teacher dislikes which student$_i$?'
b. * ku$_i$-uy sensayng -i nwukwuna$_i$-lul coahanta.
he Gen teacher Nom everyone Acc likes
'His$_i$ teacher likes everyone$_i$.'

The LF configurations of (3a) and (3b) are given as in (4a) and (4b), respectively:

(4) a. $[_{CP}$ Wh$_i$ $[_{IP}$ $[_{NP}$ .. pronoun$_i$ ..$]$ $[_{VP}$ t_i V $]]]$
b. $[_{IP}$ QNP$_i$ $[_{IP}$ $[_{NP}$ .. pronoun$_i$ ..$]$ $[_{VP}$ t_i V $]]]$

In (4) the pronoun and the variable left by Wh-movement or QR are both A′-bound by the same Quantifier, and neither c-commands the other. Thus, the examples in (3) are ruled out as instances of a WCO violation.

Based on the VP-internal subject hypothesis, Mahajan (1989) proposes that clause-internal scrambling in Hindi can be an instance of A-movement, in that scrambling of wh-phrases overrides WCO effects.[1] Likewise, when the wh-phrase is scrambled to sentence initial position, the WCO effect disappears in Korean:

(5) etten haksayng$_i$-ul [ku$_i$-uy sensayng -i t_i sileha]-ni?
which student Acc he Gen teacher Nom dislike-Q
'Which student$_i$, his$_i$ teacher dislikes t_i?'

Adopting the hypothesis that scrambling as A′-movement creates a variable, the LF configuration of (5) is represented as (6):

(6) $[_{CP}$ Wh$_i$ $[_{IP}$ t'_i $[_{IP}$ $[_{NP}$ .. pronoun$_i$ ..$]$ $[_{VP}$ t_i V $]]]]$
A'-Movement A'-Movement

In (6) the A′-bound trace t_i, which is a variable, does not c-command the pronoun, which is the WCO configuration. Thus, (5) is incorrectly predicted to be ruled out as a WCO violation.

However, if we follow Mahajan's(1989) proposal that clause internal scrambling can be an instance of A-movement, (5) could have the LF configuration, as in (7):

(7) $[_{CP}$ Wh$_i$ $[_{IP}$ t'_i $[_{VP}$ .. $[_{NP}$ .. pronoun$_i$ ..$]$ .. t_i V $]]]$
A'-Movement A-Movement

In (7) the trace left by scrambling t_i is an NP-trace, which is immune to the WCO effect. The trace created by Wh-movement t'_i is taken to be a variable, and c-commands the coindexed pronoun. Consequently, the sentence (5) is correctly predicted to be allowed if we suppose that scrambling can be A-movement.

1.2. Long Distance Scrambling and WCO. Mahajan (1989) notes that in Hindi, the syntactic fronting of a wh-phrase out of an embedded clause is obligatory when the matrix verb does not subcategorize for a question complement. If the wh-phrase stays in-situ, the sentence is ungrammatical. However, if the wh-phrase is scrambled out of the embedded clause, the sentence becomes grammatical, as shown in (8):

(8) a. * raam-ne socaa ki siitaa-ne kis-ko dekhaa thaa.
Ram thought that Sita who seen be-past
'Ram thought that Sita had seen who?'
b. kis-ko raam-ne socaa ki siitaa-ne dekhaa thaa.
who Ram thought that Sita seen be-past
'Who$_i$, Ram thought that Sita had seen t_i?'

He has also shown that in contrast to clause internal scrambling, long distance scrambling outside of a finite clause in Hindi has properties of A′-movement in that it induces crossover violations, as in (9):

(9) * kis-ko$_i$ uskii$_i$ bahin-ne socaa ki raam-ne t_i dekhaa thaa?
who(EDO) his sister(SUB) thought that Ram(ESUB) seen be-past
'Who$_i$, his$_i$ sister thought that Ram had seen t_i?'

In Mahajan's account, the structural configuration of the sentence (9) is given as (10):

(10) *[$_{IP}$ XP$_i$ [$_{IP}$ [$_{I'}$ ..[$_{NP}$. pronoun$_i$.][$_{CP}$ [$_{IP}$ t'$_i$ [$_{I'}$ .. t_i .]]]]]]
↑__________________________||↑__________|
A'-Movement A-Movement

He argues that long distance scrambling out of a finite clause leaves behind a variable, i.e. t'$_i$, and the trace *t*'$_i$ does not c-command the coindexed pronoun, resulting in a WCO violation.

However, it is interesting to notice that long distance scrambling in Korean does not trigger WCO effects, as shown by (11):

(11) nwukwu$_i$-lul [ku$_i$ -uy apeci -ka [John -i t_i ttayreyessta-ko]
who Acc he Gen father Nom Nom hit Comp
sayngkakha]-ni?
think-Q
'Who$_i$, his$_i$ father thinks that John hit t_i?'

The LF configuration of (11) is shown in (12):

(12) [$_{CP}$ Wh$_i$ [$_{IP}$ t''$_i$ [$_{IP}$ [. pronoun$_i$.][$_{I'}$ ..[$_{CP}$ t'$_i$ [$_{IP}$ .. t_i .]]]]]]
↑________||↑__________________________||↑__________|
A'-Movement A'-Movement A'-Movement

If we simply follow the hypothesis that scrambling as A′-movement creates a variable, it is expected that the WCO effect shows up in (12) because the A′-bound trace t_i, being a variable, does not c-command the coindexed pronoun. Then, the representation (12) would be incorrectly ruled out under that hypothesis.

Therefore, if we want to keep Mahajan's (1989) hypothesis that clause internal scrambling can be an instance of A-movement and long distance scrambling is A′-movement, then we need to provide an account for why long distance scrambling in Korean does not induce WCO effects, which will be discussed in section 4.

2. Successive Cyclic Scrambling: Locality Conditions on A-Chain

Given that WCO effects are not induced by long distance scrambling in Korean, we will see whether or not long distance A-scrambling out of a finite clause is allowed by independent principles.

2.1. Binding Principle A. As pointed out in Mahajan (1989), long distance scrambling out of a finite clause can never be A-movement by virtue of locality conditions on Binding. Let us consider the following representation:

(13) *[$_{IP}$ XP$_i$ [$_{I'}$ ..[$_{NP}$ ..pronoun$_i$ ..] [$_{CP}$ [$_{IP}$ t'$_i$ [$_{I'}$ .. t$_i$ ..]]]]]
↑______________________________|↑__________|
A-Movement A-Movement

In (13), if we suppose that long distance scrambling takes place as A-movement, then it would leave behind an NP-trace *t'*$_i$ in the embedded IP SPEC. If the governing category of the trace *t'*$_i$ is restricted to the embedded finite clause, the trace *t'*$_i$, as an NP-trace, is not bound in its governing category. Therefore, the derivation in (13) would be excluded as a violation of Condition A.

2.2. Condition on A-Chain (Chomsky (1986)). On independent grounds, successive cyclic A-scrambling is impossible due to Chomsky's (1986) *antecedent government* requirement on NP-traces.

(14) * [$_{IP}$ XP$_i$ [$_{I'}$ ...[$_{*CP}$ [$_{IP}$ t'$_i$ [$_{I'}$ ..t$_i$ ..]..]..]..]..]
↑____________________|↑__________|
A-Movement A-Movement (*CP is a barrier.)

As suggested in Chomsky (1986), each link of an A chain must be 0-subjacent, which means that A-movement may not take place across a barrier. In (14) the second A-movement, which crosses the embedded CP, is not allowed because the embedded CP is a barrier. Thus, the configuration (14) is ruled out.

2.3. Extended Uniformity Condition (Lasnik & Saito (in press)). Furthermore, according to the *Extended Uniformity Condition*, proposed in Lasnik & Saito (in press), A-movement may not take place across a barrier, which implies that successive cyclic A-scrambling is illicit because it involves A-movement crossing a barrier.

(15) Extended Uniformity Condition
Suppose β bears a θ-role assigned by α. Then, if γ is a barrier for α, γ dominates β. (s-structure)
(Lasnik & Saito (in press))

With the condition (15), we may reconsider the case of successive-cyclic A-scrambling.[2]

(16) [$_{IP1}$ XP$_i$ [$_{I'}$ .. [$_{CP}$ [$_{IP2}$ t'$_i$ [$_{I'}$ [$_{VP2}$ .. t$_i$ V$_2$]]]]..]]
↑____________________|↑________________|
A-movement A-movement

In (16) *XP*$_i$ bears a 0-role assigned by the embedded verb *V*$_2$. Since VP is not a barrier, the barrier for the verb *V*$_2$ is the *IP*$_2$. Then, the first A-movement is allowed under the *Extended Uniformity Condition*, since the barrier IP_2 dominates t'_i. However, the second A-movement is illicit, because the barrier IP_2 does not dominate XP_i.

2.4. Improper Movement: CP SPEC as an Escape Hatch for A'-Movement. Note that in configurations (13), (14) and (16), successive cyclic A-scrambling out of a finite clause does not use the embedded CP SPEC as an escape hatch. The reason is that long distance A-movement via CP SPEC causes a violation of Condition C.

```
                       A-bind
          |--------------------------|
(17) [IP XPi  [I' ...[CP  t'i  [IP .... ti ....]] ... ]]
          ↑______________||______________|
              A-Movement     A'-Movement
```

In (17) the first movement to CP SPEC leaves behind a variable t_i. Then, the second movement to A-position results in a Condition C violation, since the variable t_i is A-bound by XP_i. This type of movement is called *improper movement*.

In fact, long distance A-movement may take place if it does not pass through A'-position such as CP SPEC. The example like (18) shows that long distance NP-movement takes place successive-cyclically through the embedded IP SPEC:

(18) $[_{IP}$ John is believed $[_{IP}$ t_4 to be likely $[_{IP}$ t_3 to seem $[_{IP}$ t_2 to have been arrested t_1]]]]

Furthermore, even if we suppose that CP SPEC is taken to be A-position, the following examples, where A-movement passes via CP SPEC, would still pose a problem:

(19) a. * $[_{IP}$ John$_i$ seems $[_{CP}$ t'_i $[_{C'}$ that $[_{IP}$ it is told t_i [that Mary is smart]]]]] (cf. Lasnik & Saito (in press))

b. * $[_{IP}$ John$_i$ seems $[_{CP}$ t'_i $[_{C'}$ that $[_{IP}$ it is likely $[_{IP}$ t_i to be smart]]]]] (cf. Deprez (1990))

If we assume that CP SPEC is A-position, the examples in (19) do not violate *improper movement*. On the other hand, if CP SPEC is taken to be A'-position, the examples in (19) are ruled out as cases involving *improper movement*; the variable t_i is A-bound by *John*, resulting in a Condition C violation.[3]

3. Scrambling and Reconstruction Effect

Empirical evidence for the claim that scrambling is A'-movement comes from the reconstruction effect, which is considered a property of A'-movement.

It is generally believed that A'-movement shows reconstruction effects, whereas A-movement does not show them, as shown below:

(20) a. * [Whose$_i$ brother]$_j$ did he$_i$ see t_j?

b. $[_{CP}$ [whose$_i$ brother]$_j$ $[_{IP}$ t'_j seems to him$_i$ $[_{IP}$ t_j to be smart]]]

In (20), what the pronoun c-commands is not the coindexed trace but the trace of the noun phrase containing the coindexed wh-phrase *whose*. However, contrary to

(20b), (20a) has the status of SCO or has the reconstruction effect with respect to Condition C.

Scrambling constructions can now be compared with passive and raising constructions.

(21) a. * [nwukwu$_i$-uy haksayng]$_j$-ul ku$_i$-ka t$_j$ ttayryess-ni?
who Gen student Acc he Nom hit-Q
'[Whose$_i$ student]$_j$, he$_i$ hit t$_j$?'
b. [nwukwu$_i$-uy sacin]$_j$ -i ku$_i$-ekey t$_j$ ponayciess-ni?
who Gen picture Nom he Dat be sent-Q
'[Whose$_i$ picture]$_j$ was sent (to) him$_i$ t$_j$?'(cf. Tada (1990))

Clause internal scrambling in (21a) triggers the reconstruction effect, but passivization in (21b) does not. Then, consider the following examples:

(22) a. * [nwukwu$_i$-uy haksayng]$_j$-ul [Mary-ka ku$_i$-ekey [John -i t$_j$
who Gen student Acc Acc he Dat Nom
coahanta -ko] malhayss]-ni?
likes Comp told-Q
'[whose$_i$ student]$_j$, Mary told him$_i$ that John likes t$_j$?'
b. [nwukwu$_i$-uy atul]$_j$ -i ku$_i$-ekey [t$_j$ ttokttokhan] keskat-ni?
who Gen son Nom he Dat be clever seems-Q
'[Whose$_i$ son]$_j$ seems to him$_i$ [t$_j$ to be clever]?'

It is noted that long distance scrambling in (22a) requires reconstruction, but that raising in (22b) does not require it. (21) and (22) then show that contrary to passive and raising, scrambling in general requires reconstruction, triggering a Condition C violation. Therefore, this contrast indicates that scrambling has a property of A′-movement.

4. Scrambling is not True Operator Movement

Going back to the puzzle noted in (11), where the expected WCO effect does not show up in Korean long distance scrambling, the problem appears to be related to the hypothesis that scrambling as A′-movement leaves a variable. What we will speculate on next, is the nature of scrambling, that is, whether or not scrambling leaves a variable, which is relevant for WCO effects.

If we recall that Wh-movement and Quantifier Raising on the one hand, and Scrambling on the other, behave differently with respect to WCO phenomena in Korean, scrambling should be differentiated from A′-movements triggered by scope requirements. Every wh-phrase and quantifier phrase must move to an operator position to bind its trace as a variable. We might ask a question whether scrambling shares some property with Wh-movement and QR, such as quantificational property. The works done by Saito (1989) and Webelhuth (1989) shed light on the differentiation of scrambling from other operator A′-movements.

Saito (1989) suggests that scrambling, as semantically vacuous S-structure movement, does not establish a semantically significant operator-variable relation and it can be undone in the LF component.[4] What this claim implies is that a scrambled phrase need not be represented as an operator at LF. His hypothesis is consistent with Webelhuth's (1989) proposal that scrambling is uniformly an adjunction operation, and the adjunction position is neither an argument position nor an operator position. Saito further distinguishes scrambling from English

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topicalization and Wh-movement. His suggestion implies that there are two types of A′-positions: while the landing site of English topicalization, Wh-movement or Quantifier Raising is an operator A′-position, the landing site of scrambling is a non-operator A′-position. From this, it seems plausible to propose the following hypothesis:[5]

(23) *Quantifier Movement* like Wh-Movement and QR, as movement
to an operator A′-position, leaves behind a variable,
whereas scrambling of wh-phrase or quantifier phrase, as
movement to a non-operator A′-position, does not.

Therefore, it follows that the trace created by *Quantifier Movement*, being a variable, participates in the WCO effect, but that the trace generated by scrambling, not being a variable, is free from the WCO effect.

If we admit that there are two types of A′-positions, we can account for the different behavior of long distance scrambling in Hindi and in Korean with respect to WCO effects. Let us consider Hindi and Korean examples, (9) and (11) being repeated below as (24) and (25), respectively:

(24) * kis-ko$_i$ uskii$_i$ bahin-ne socaa ki raam-ne t$_i$ dekhaa thaa?
who(EDO) his sister(SUB) thought that Ram(ESUB) seen be-past
'Who$_i$, his$_i$ sister thought that Ram had seen t$_i$?'

(25) nwukwu$_i$-lul [ku$_i$ -uy apeci -ka [John -i t$_i$ ttayreyessta-ko]
who Acc he Gen father Nom Nom hit Comp
sayngkakha]-ni?
think-Q
'Who$_i$, his$_i$ father thinks that John hit t$_i$?'

If the wh-phrase in (24) moves to an operator position, the wh-phrase may have quantificational force. Therefore, the movement of the wh-phrase to an operator position in (24) is *Quantifier Movement* leaving behind a variable, and thus, the WCO effect is expected to occur. On the other hand, we cannot rule out the logical possibility of syntactic Wh-movement in (24). Recall that if the wh-phrase stays in-situ, the sentence is ungrammatical, as was shown in (8). The wh-phrase in (24) may undergo syntactic Wh-movement to CP SPEC, which means that the wh-phrase moves to an operator position, creating a variable.

In contrast to Hindi, Korean wh-phrase can remain in-situ in the embedded clause, rather scrambling being optional. If long distance scrambling of the wh-phrase in (25) is movement to a non-operator A′-position, the wh-phrase may not have quantificational force. Consequently, given the hypothesis (23), scrambling of the wh-phrase in (25), not being *Quantifier Movement*, does not leave a variable, and hence, the WCO effect does not show up. Now, we may raise a question as to what kind of trace scrambling generates.

5. Lasnik & Stowell's (1991) Null Epithet and Scrambling

5.1. Null Epithets in English 'Tough', PG and Topicalization Constructions. Lasnik & Stowell (1991) argue that the previous works on A′-Binding or variables cannot accommodate the fact that expected WCO effects do not show up in English *Tough* Movement, Parasitic Gap and Topicalization constructions, as shown in (26):

(26) a. John$_i$ was hard [NO$_i$ [PRO to persuade his$_i$ boss [PRO to vouch for e_i]]
b. Which man$_i$ did you look at t_i [NO$_i$ [before his$_i$ wife had spoken to e_i]]
c. John$_i$ [I believe [his$_i$ mother loves e_i]]

Their claim is that WCO effects do not follow exclusively from the structural configuration of A′-binding. They attribute the lack of WCO effects to the semantically nonquantificational status of the operator in A′-position, and propose a previously unrecognized syntactic type of empty category, i.e. *a null epithet* sharing binding properties with names and definite descriptions, rather than with variables. Their theory is summarized as follows:

(27) The traces locally A'-bound by true Quantifier Phrases are variables and exhibit WCO effects, whereas traces locally A'-bound by non-Quantifier Phrases are null epithets and do not show WCO effects. (Lasnik & Stowell (1991))

In (26) the trace e_i is locally A′-bound by a non-Quantifier Phrase, the null operator in (26a) and (26b) and *John* in (26c). Therefore, according to (27), WCO effects are not induced in (26), since the trace e_i is not a true variable but a null epithet.

5.2. Scrambling as A′-Movement Creates a Null Epithet. If we consider that scrambling does not trigger WCO effects, it provides further evidence for the existence of a null epithet. Now, recall that scrambling of a wh-phrase does not result in a WCO violation. It is, therefore, claimed that in defining a null epithet, we should take into consideration the semantically nonquantificational property of movement, as well as the semantically nonquantificational status of the operator. Then, I will define *Quantifier Movement* and *non-Quantifier A′-Movement* as follows:

(28) (i) *Quantifier Movement* moves a quantified NP to an operator position.
(ii) *Non-Quantifier A'-Movement* moves a non-quantified NP to an operator position or any NP to a non-operator position.

Given (28), we can now distinguish a null epithet from a true variable with recourse to not only the landing site of the movement, but also the quantificational property of the moved element:

(29) The trace created by *Quantifier Movement* is a true variable and is subject to the WCO constraint. On the other hand, the trace created by *non-Quantifier A'-Movement* is a null epithet and does not show the WCO effect.

It follows then that Wh-Movement and Quantifier Raising, which move a quantified NP to an operator A′-position, are classified as *Quantifier Movement*, showing WCO effects, and that Null Operator Movement, which moves a non-quantified NP to an operator A′-position, and Scrambling, which is movement to a non-operator A′-position, are classified as *non-Quantifier A′-Movement*, not inducing WCO effects.[6]

6. Consequences and Implications

6.1. Null Epithet and Binding Principle C. We will now deal with Strong Crossover constructions derived by scrambling. If the trace created by scrambling always has the status of a null epithet, Condition C effects are expected in SCO configurations, because the null epithet, as an R-expression, is subject to Condition C:[7]

(30) a. * nwukwu$_i$-lul ku$_i$-ka t$_{ei}$ sileha-ni?
who Acc he Nom dislikes-Q
'Who$_i$, he$_i$ dislikes t$_i$?'
b. * nwukwu$_i$-lul [ku$_i$-ka [Sue-ka t$_{ei}$ coahanta-ko] mit]-ni?
who Acc he Nom Nom likes Comp believes-Q
'Who$_i$, he$_i$ believes that Sue likes t$_i$?'

In (30) the trace *t$_e$* created by scrambling is, according to our hypothesis, a null epithet and it is A-bound by the pronoun *ku 'he'*. Thus, the examples in (30) are ruled out by Condition C, because a null epithet as an R-expression is A-bound.

6.2. Null Epithet in Relative and 'Tough' Constructions. Other constructions, where expected WCO effects do not show up, are relative and *Tough* constructions in Korean.

6.2.1. Relative Constructions. It has been maintained that in Korean, relativization is constrained by Subjacency and thus relative constructions involve null operator movement (Hong (1985)). Then, let us observe the following examples:

(31) a. [[[ku$_i$-uy anay -ka t$_{ei}$ kosohan] NO$_i$] John$_i$]-i salaciessta.
he Gen wife Nom sued Nom disappeared
'John$_i$, who his$_i$ wife sued t$_i$, disappered.'
b. [[[sensayng -i kutul$_i$-uy pwumo-ekey t$_{ei}$ ponayn] NO$_i$]
teacher Nom they Gen parent Dat sent
ce haksayngtul$_i$] -i nuckey tolawassta.
those students Nom late came back
'Those students$_i$, who a teacher sent t$_i$ (to) their$_i$ parents,
came back late.'

In (31) the pronoun and the trace *t$_e$* are both A′-bound by the null operator and neither c-commands the other. However, WCO effects are not present, since the trace left by null operator movement, which moves a non-quantified NP to an operator position, is a null epithet and it does not participate in WCO effects. Therefore, (31) supports our hypothesis that null operator movement, as *non-Quantifier A′-Movement*, creates a null epithet and does not exhibit WCO effects

6.2.2. 'Tough' Constructions. Another possible construction, which involves null operator movement, would be *Tough* constructions. Takezawa (1987) has shown that there are two derivations in Japanese *Tough* sentences, one by null operator movement in the case of NP or PP *Tough* constructions, and the other by making use of an empty pronoun in the case of NP *Tough* constructions. First, consider the following Korean NP *Tough* construction:

(32) i nonmwun$_i$ -i kyoswu$_j$ -eykey [e_j [[e_k e_i ssun]
this dissertation Nom professor for wrote
haksayng$_k$]-ul pyengkahaki] eryepta.
student Acc evaluate is hard
'This dissertation$_i$ is hard for a professor to evaluate
a student who wrote t_i.'

In (32), given that the gap e_i does not show the Subjacency effect, it must be a base-generated empty pronoun. Thus, NP *Tough* constructions cannot be used for a test to see whether the trace created by null operator movement is subject to the WCO Constraint.

On the other hand, as illustrated in (33), the gap in Korean PP *Tough* construction obeys Subjacency, indicating that it is the trace left by null operator movement:

(33) * ce hakkyo-lopwute$_i$-ka John$_j$-eykey [e_j[[e_k e_i thoyhaktanghan]
that school from Nom for got kicked out
haksayng$_k$-eykey malkelki] ereypta.
student to speak is difficult
'[From that school]$_i$ is difficult for John to speak to
a student who got kicked out e_i.'

If the movement of a null operator is involved in PP *Tough* constructions, it is expected that WCO effects are not induced, as in (34):

(34) enu toshi-eyse$_i$-ka John$_j$-eykey [$_{CP}$ NO$_i$[e_j [[e_k sip nyen ceney
which city-in Nom for ten years ago
e_i/kukos-eyse$_i$ salassten] salam$_k$]-eykey [PRO tasi $t_{\bullet i}$ salla-ko]
there-in lived person Dat again live Comp
seltukhaki]] swip -ni?
persuade is easy-Q
'[In which city]$_i$ is easy for John [NO$_i$ [to persuade the
person who lived there$_i$ to live $t_{\bullet i}$ again]]?'

In (34) the overt pro form *kukos-eyse 'in there'* and the trace $t_{\bullet i}$ are both A′-bound by the null operator, and neither c-commands the other. The WCO effect is, however, absent. Therefore, the hypothesis that null epithets created by null operator movement are immune to WCO effects is borne out in PP *Tough* constructions.

6.3. Parasitic Gap (PG) or Empty Pronoun? In this section, we examine Hoji's (1985) PG analysis and see how the relevant data can be handled by the hypothesis that scrambling creates a null epithet. Consider the following Korean example:

(35) etten haksayng$_i$-ul [kyosa -ka [$_{PP}$ kyocang -i hanpen e_i
which student Acc teacher Nom principal Nom once
mannan hwuey] cip -ulo $t_{\bullet i}$ ponayess]-ni?
met after house to sent-Q
'Which student$_i$, a teacher sent t_i home after a principal
met e_i?'

If the gap e_i in (35) is a base-generated empty pronoun, (35) is an apparent counter example to the WCO Constraint (1) under the assumption that scrambling as A′-

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movement leaves behind a variable. In order to account for this type of data, Hoji (1985) argues that the gap in question is not an empty pronoun, but an instance of a PG, licensed by syntactic A′-movement.

However, the evidence that the gaps are not necessarily PGs follows from the observation that they do not exhibit Subjacency effects, as shown by (36):[8]

(36) etten haksayng$_i$-ul [hyengsa -ka [$_{PP}$ kyocang -i [$_{NP}$ [$_{CP}$ e$_j$ e$_i$
which student Acc detective Nom principal Nom
ttayrin] sensayng$_j$]-ul myentamhaki ceney] t$_{ei}$ mannass]-ni?
hit teacher Acc interviewed with before met-Q
'Which student$_i$, a detective met t$_i$ before a principal
interviewed with a teacher who hit e$_i$?'

If the empty category *e*$_i$ were a PG created by null operator movement, it should not be able to occur in a Complex NP island within the adjunct clause. Therefore, the example (36) indicates that the gap is an empty pronoun, and further supports our hypothesis that scrambling leaves a null epithet and thus does not induce WCO effects.

7. Conclusion

We have discussed syntactic properties of scrambling with respect to Crossover phenomena, which cannot be well accounted for by the traditional A/A′ distinction. This paper has shown that scrambling is distinguished from other operator A′-movements, such as Wh-movement and QR, and provided evidence for the existence of a non-operator A′-position. Furthermore, Lasnik & Stowell's (1991) proposal that there exists a new syntactic type of empty category, i.e. a null epithet, has led us to suggest that scrambling in Korean, as movement to a non-operator A′-position, leaves behind not a true variable, but a null epithet. What this paper has demonstrated is that the IP-adjoined position in Korean is the third type of position, a non-operator A′-position, and scrambling to this position is non-operator A′-movement, creating a null epithet, which is free from WCO effects and, as an R-expression, is subject to Binding Condition C.

FOOTNOTES

* I would like to thank Howard Lasnik and Mamoru Saito for their guidance and insightful comments in the improvement of this paper. I have also benefited from discussion with Jeong-Shik Lee. Of course, all errors are mine.

1. Based on the observation that clause internal scrambling in Hindi suppresses WCO effects and provides an antecedent for an anaphor, Mahajan (1989) maintains that clause internal scrambling can be a case of A-movement. However, for the purpose of this paper, I will put aside anaphor binding facts, which Mahajan used to distinguish between A- and A′-movement. Rather, I will concentrate on investigating Crossover effects and their implications for properties of scrambling.

2. We assume the following definition and hypotheses proposed in Lasnik & Saito (in press):
   (i) α is a barrier for β if α is a maximal projection, α is not L-marked, and α dominates β.
   (ii) VP can be L-marked by INFL, and when it is, it is not a barrier.
   (iii) IP, like other categories, becomes a barrier when not L-marked.
   (iv) All barriers are inherent barriers, i.e. there is no inheritance of barrierhood.

3. The sentences in (19) also violate the *Extended Uniformity Condition*.

4. See Cho (1990) for more detailed discussion of the interaction between LF-reconstruction of scrambling and WCO phenomena.

5. I regard Wh-movement and QR as *Quantifier Movement*, since they are related to scope effects.

6. In Cho (1990), I discussed the difference between English topicalization of quantifier phrases (QP) and non-QP with regard to WCO phenomena. Since English topicalization is movement to the operator position, topicalization of QP as in **Everyone*$_i$, *his*$_i$ *mother likes*, which moves the quantified NP to the operator position, is argued to be *Quantifier Movement*, and hence, leaves behind a variable, resulting in a WCO violation. On the other hand, in *John*$_i$, *his*$_i$ *mother likes*, the topicalized non-quantified NP *John* does not have quantificational force, even in the operator position, since *John* is not a quantificational element. It follows then that English topicalization of the non-quantified NP, which moves a non-quantified NP to an operator position, is claimed to be *non-Quantifier A′-Movement* and thus leaves a null epithet, not inducing the WCO effect.

7. A null epithet will be represented as t_e.

8. It has been argued in Contreras (1984) and Chomsky (1986) that parasitic gaps are traces created by the movement of a null operator, and they are constrained by Subjacency, which is a condition on movement. The main argument for their theory is that a parasitic gap cannot occur in a Subjacency island within the adjunct.

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ESCOL '91 46-68

POLARITY, INVERSION, AND FOCUS IN ENGLISH*

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The goal of the research reported on here is to understand in some detail the nature of adjunction to sentence-initial position in English in particular and in Universal Grammar in general. Here I focus on the functional categories that may occur external to the subject. The relevant constructions include Topicalization, inversion in questions and Negative and *So*-Inversion. I argue that there are two sentence-initial functional categories in English, as illustrated in (1). "Pol(P)" abbreviates "Polarity (Phrase)," while C is the familiar complementizer.[1]

(1) $[_{CP}$ Spec C $[_{PolP}$ Spec Pol $[_{IP}$ ...]]]

I argue that there are generalizations that can be best explained if we assume the existence of both C and Pol, with their associated maximal projections and specifiers.[2]

The literature suggests that C can range at least over *that*, and [*e*]; I will argue that there is also a complementizer Q. I show that Pol may be Neg, Wh and So.[3] I also provide some evidence that Pol may be Focus in English as well as in other languages. I assume that movement into [Spec,PolP] is licensed through Spec-head agreement, as is movement into [Spec,CP]. Such licensing depends crucially on the ability of the particular head to participate in an agreement relationship with Spec (Chomsky 1986; Rizzi 1990, Rizzi 1991). When Pol happens to be a bound morpheme, as is the case with Neg, Wh and So but not Focus, Infl must raise and adjoin to Pol, yielding the familiar derived structure of Subject-Aux Inversion. I assume that "topic" Topicalization, where the topic does not carry primary stress (Gundel 1974), is adjunction to a maximal projection (e.g. CP, PolP or IP), and is not substitution for a Spec (Rochemont 1989, Lasnik and Saito, to appear). However, I suggest that "focus" Topicalization (Gundel 1974) may in fact be substitution for [Spec,PolP] when Pol is Focus.

These points are developed in the following way. Section 1 demonstrates that Topicalization and Negative Inversion involve different landing sites for the fronted constituent. Topicalization creates a "topic island" while Negative Inversion does not. The conclusion is that the first is adjunction (to PolP or IP), while the second is substitution into a specifier position to the right of the complementizer, i.e. [Spec,PolP].

Section 2 explores a range of evidence to support the analysis, including the suspension of the *that-t* effect, the possibility of inversion in embedded sentences with fronted negation and *so*, but not with fronted *wh*, and some subtle differences between *why* and *how come*.

In order to account for the licensing of subject *wh* and subject *neg-/so*, it is necessary to assume that in English PolP may be a complement of Infl as well as of C. Section 3 pursues some implications of this analysis and extends it to the account of related constructions in Hungarian, English and other languages.

For present purposes I adopt aspects of the theoretical perspective of Rizzi (1990) as modified by Cinque (1990), and of Lasnik and Saito (to appear). It will simplify the discussion considerably to assume that the subject in English originates as [Spec,IP], and that Subject-Aux Inversion involves movement of Infl to the left. One plausible alternative, that the subject originates in VP and that subject and Aux remain *in situ* in S-structure, raises difficult questions concerning Case assignment and the licensing of specifiers that I cannot deal with within the scope of this paper.[4] For the same reason I must also leave open the complicated question of whether the functional head Pol may be a variant of some other functional head, such as Agr-S, or some type of aspectual head.

1. Two landing sites

On the standard view of English complementizer structure, it is hard to see how to fully accommodate Negative Inversion. In the structure (2) --

(2) $[_{CP}$ Spec C IP$]$

-- the position of a fronted negative phrase (XP[Neg]) must either be that of a fronted *wh*, or that of a topic. I provide some evidence that it is neither.

On the standard GB view of English *wh*-questions, the *wh* moves into [Spec,CP], and Infl adjoins to C. Both movements are structure-preserving (Chomsky 1986, Baker 1988).

(3) $[_{CP}$ $[_{Spec}$ what$_i]$ Q+will$_j$ $[_{IP}$ Robin t_j $[_{VP}$ say $t_i]]]$

In contrast, there is evidence (see Baltin (1982) and Lasnik and Saito, to appear) that Topicalization is (non-structure-preserving) adjunction to IP. This is plausible, since the topic appears to the right of the complementizer *that* in an embedded clause.

(4) a. I think that, to Lee, Robin gave a book.
b. Lee said that, on the table, she is going to put the yellow dishes.
c. Robin says that, the birdseed, he is going to put in the shed.

The ungrammatical cases in (5) and (6) show the impossibility of multiple adjunction to IP.[5]

(5) a. *What did, to Lee, Robin give?

b. *Which dishes are, on the table, you going to put?
c. *Where are, the birdseed, you going to put?

(6) a. *I asked what, to Lee, Robin gave.
b. *Lee forgot which dishes, on the table, you are going to put.
c. *Robin knows where, the birdseed, you are going to put.

To rule these examples out, we may follow Cinque (1990) in saying that a maximal projection that is not (category)-selected is a barrier to extraction. In the case of adjunction to IP, the newly created IP satisfies the category selection requirement of C, but the original IP does not.[6] Hence the original IP is a barrier sufficient to block subsequent extraction, and a "topic island" arises (Lasnik and Saito (to appear), Rochemont (1989)). The double bracket denotes a barrier.

(7) NP forget $[_{CP}$ Spec C $[_{IP}$ [on the table] $[\![_{IP}$ you are going to put which dishes]]]

Now compare Negative Inversion, as in (8).

(8) a. Lee said that at no time would she agree to visit Robin.
b. It is apparent that only on Fridays will the traffic be too heavy to get there in time.
c. The fact that on not a single hat was there a propeller indicates how far the beanie has fallen in modern times.

At no time, etc. are fronted expressions that are preceded by C and are followed by an inverted I(nfl). If they are topics, they are adjoined to IP. Then in these inversion examples, Infl must also adjoin to IP, in violation of the requirement that movement of a head must be a substitution or an adjunction to another head.[7] On the other hand, if the fronted expression is adjoined to CP, then *that* cannot be C.

Extraction from clauses in which Negative Inversion has applied cannot be easily accommodated within this framework, regardless of which structure we choose. If Negative Inversion is assumed to pattern like a *wh*-question, extraction from a Negative Inversion clause should be blocked by the same mechanism that blocks extraction from *wh*-islands in English. On the other hand, if Negative Inversion is assumed to pattern like Topicalization, extraction should be blocked by the same mechanism that blocks extraction from topic islands. In either case, extraction should be impossible, but it is not. The relevant data is given in (9)-(14).

(9) These are the books {which/that} Lee says that,
{ ?*with great difficulty, she can carry
*to Robin, she will give
*on the table, she will put }

(10) These are the books {which/that} Lee says that
{ only with great difficulty can she carry
only to Robin will she give
only on the table will she put }

(11) Which books did Lee say that { ?*with great difficulty, she can carry
*to Robin, she will give
*on the table, she will put }

(12) Which books did Lee say that { only with great difficulty can she carry
only to Robin will she give
only on the table will she put }

(13) On which table did Lee say that { *with great difficulty, she can put the books
*for Robin, she will put the books
*these books, she will put }

(14) On which table did Lee say that { only with great difficulty would she put the books
only for Robin would she put the books
only these books would she put }

The contrast between Topicalization and Negative Inversion sentences with respect to extraction shows that the fronted negative does not create a topic island. Taking *that* to be C, we conclude that there must be a **substitution** site for the negative. Hence these sentences show that C can take as its complement a maximal projection that is distinct from IP. This maximal projection contains a Spec and a head, just like CP. Call this new projection PolP. The head of PolP may be Neg, which agrees with a negative in [Spec,PolP] under Spec-head agreement.[8]

2. Additional evidence

In this section I consider additional evidence to support the conclusion that there is a PolP. Because of space limitations, I will focus on just three phenomena: the *that-t* effect, Subject-Aux Inversion, and *why/how come*.

2.1. Suspension of the *that-t* ECP effect

Here I show that the presence of an empty Pol licenses extraction of a subject in English even when C is *that*, just as an empty complementizer allows extraction of the subject (Rizzi 1990). The presence of Pol makes it possible to explain cases in which the expected *that-t* effect due to ECP is suspended.

There are certain sentence-level adjunctions in English that do not appear to give rise to topic islands. The examples in (15) show that adjuncts such as *for all intents and purposes*, *yesterday*, *in NP's opinion*, and *under normal circumstances* have this property.

(15) a. Robin met the man {Op$_i$ that/who$_i$} for all intents and purposes t_i was the mayor of the city.
b. This is the tree {Op$_i$ that/which} just yesterday I had tried to dig up t_i with my shovel.
c. I asked what$_i$ in your opinion Robin gave t_i to Lee.
d. Lee forgot which dishes$_i$ under normal circumstances you would put t_i on the table.

In each of these cases there is extraction of *wh* over an adjunct, yet no topic island violation of the sort seen in examples such as (5), (6), (11) and (13) above. I speculate that these adjuncts are underlying and not moved into the adjoined position. Why only movement should create topic islands is a complex matter that I cannot go into here (for discussion, see Culicover 1991a). In any case, the empirical evidence in (15) shows that not all adjuncts create topic islands.

Suppose now that XP is the kind of PolP-adjunct that does not produce a topic island. A constituent α can move into [Spec,PolP] and then into [Spec,CP] over such a PolP-adjunct, as (16) illustrates.

(16) $[_{CP}\ [_{Spec}\ \alpha_i]\ \text{C}\ [_{PolP}\ \text{XP}\ [_{PolP}\ [_{Spec}\ t_i']\ \text{Pol}\ [_{IP} \ldots t_i \ldots]]]]$

Now let α_i be the subject of IP. Furthermore, let C be *that*, which cannot undergo Spec-head agreement (Rizzi (1990)).

(17) $\ldots[_{CP}\ [_{Spec}\ \alpha_i]\ \text{that}\ [_{PolP}\ \text{XP}\ [_{PolP}\ [_{Spec}\ t_i']\ \text{Pol}_i\ [_{IP}\ t_i \ldots]]]]$

Pol here can undergo Spec-head agreement with the trace t_i' in [Spec,PolP]. With Spec-head agreement, Pol receives the index i of α_i; hence Pol is coindexed with the subject trace t_i. Thus, Pol properly head-governs t_i, and there is no ECP violation. (We may assume that t_i' is deleted or is otherwise not subject to ECP. See Lasnik and Saito (1984) for one approach.)

I therefore predict the existence of grammatical sentences in which the subject has moved over an XP adjoined to PolP and then out of a *that*-clause without creating an ECP violation of the *that-t* variety. This prediction is confirmed by the examples in (18).

(18) a. Robin met the man {that Op$_i$/who$_i$} Leslie said that for all intents and purposes t$_i$ was the mayor of the city.
b. This is the tree that Op$_i$ I said that just yesterday t$_i$ had resisted my shovel.
c. I asked what$_i$ Leslie said that in her opinion t$_i$ had made Robin give a book to Lee.
d. Lee forgot which dishes$_i$ Leslie had said that under normal circumstances t$_i$ should be put on the table.

The examples in (18) show that without the topic island, the presence of Pol licenses extraction of the subject. The *that-t* effect does not occur here, as predicted, because *that* does not occupy the position of the potential head-governor for the subject trace. Thus, (18) contrasts sharply with (19), and falls together with (20) in grammaticality.

(19) a. *Robin met the man {that Op$_i$/who$_i$} Leslie said that t$_i$ was the mayor of the city.
b. *This is the tree that Op$_i$ I said that t$_i$ had resisted my shovel.
c. *I asked what$_i$ Leslie said that t$_i$ had made Robin give a book to Lee.
d. *Lee forgot which dishes$_i$ Leslie had said that t$_i$ should be put on the table.
(20) a. Robin met the man {that Op$_i$/who$_i$} Leslie said [e$_i$] t$_i$ was the mayor of the city.
b. This is the tree that Op$_i$ I said [e$_i$] t$_i$ had resisted my shovel.
c. I asked what$_i$ Leslie said [e$_i$] t$_i$ had made Robin give a book to Lee.
d. Lee forgot which dishes$_i$ Leslie had said [e$_i$] t$_i$ should be put on the table.

Naturally, we have to assume that when Pol and [Spec,PolP] are entirely empty and when nothing adjoins to PolP, PolP is pruned from the structure or is otherwise not permitted to appear. For if we were to allow empty [Spec,PolP] and a PolP with nothing adjoined to it, we would never get the *that-t* effect. Crucially, we cannot take the non-topic island adjuncts to be in [Spec,PolP], because we would then lack the formal mechanism for linking Pol with the subject in trace position through Spec-head agreement with a trace in [Spec,PolP].

2.2. Subject-Aux Inversion

I turn now to the question of why inversion occurs when a negative constituent is moved into [Spec,PolP].[9] It is plausible that inversion occurs in this case as a direct consequence of this movement. Modifying and generalizing a suggestion of Pesetsky (1987) for interrogatives, suppose that Neg is a morpheme that must cliticize to another head.[10] In the configuration --

(21) $[_{PolP}\ [_{Spec}\ \mathrm{XP[Neg]}]\ [_{Pol}\ \mathrm{Neg}]\ [_{IP} \ldots \mathrm{I} \ldots]]$

-- there is no such head adjacent to $[_{Pol}$ Neg]. Therefore, the head of IP must raise and adjoin to Pol.[11]

(22) $[_{PolP}\ [_{Spec}\ \mathrm{XP[Neg]}]\ [_{Pol}\ \mathrm{Neg}]+\mathrm{I}_i\ [_{IP} \ldots t_i \ldots]]$

This raising of I to Pol constitutes Subject-Aux Inversion.[12]

This general picture appears plausible, but working out the implementation raises some questions. Most prominently, why does inversion apply in direct questions but not in embedded questions? It cannot be the case that Subject-Aux Inversion *per se* is a "root transformation," as originally suggested by Emonds (1970;1976), because Negative Inversion and *so*-Inversion can be embedded, as we have seen.

The simple fact that inversion occurs in a direct question shows that $[_{Pol}$ Wh] can occur in main clauses. The derivation is the following, where XP[Wh] is an XP with the Wh feature.

(23) $[_{PolP}\ [_{Spec}\ \mathrm{XP[Wh]}]\ [_{Pol}\ \mathrm{Wh}]+\mathrm{I}_i\ [_{IP} \ldots t_i \ldots]]$

It is clear that a *wh*-phrase must also move to initial position in an embedded question. The functional head of the embedded question requires Spec-head agreement with the fronted *wh*-phrase. Inversion does not occur in these cases, so the functional head cannot be $[_{Pol}$ Wh], if we hold to the assumption that $[_{Pol}$ Wh] is a morpheme that triggers inversion. Since the interrogative character of an embedded complement can be selected by the matrix verb (Grimshaw 1979), the head that licenses *wh* movement in embedded questions cannot be Pol; the verb can only select the complementizer. Hence the functional head must be an interrogative complementizer distinct from $[_{Pol}$ Wh], and which in fact excludes $[_{Pol}$ Wh].

I will call this complementizer Q. Q, like *that*, appears in embedded contexts only. That is, I assume that in general complementizers *per se* do not appear in main clauses, which are projections of I or Pol only.

Crucially, any analysis that assumes the existence of both C and Pol is capable of accounting for the fact that inversion does not occur in embedded questions. The complementizer Q, as befits a complementizer, occurs in embedded questions.[13] $[_{\text{Pol}}$ Wh] occurs only in main clauses and triggers inversion in direct questions for reasons that we have discussed. Without assuming both C and Pol, it is not clear how to avoid a direct stipulation concerning when inversion may occur in questions.

In order for this analysis to be successful, the sequence C - Pol in embedded clauses must in general be possible; the sequence C - Wh is excluded in embedded sentences (presumably on principled grounds[14]) but sequences of the form C - Neg and C - So exist.[15] In fact we have already seen instances of *that* - Neg and *that* - So. The other combinations tend to be more or less acceptable.

(24) a. ?Lee wonders whether at no time at all would Robin volunteer
b. Lee wonders whether only then would Robin volunteer
c. ?Lee wonders whether so many people did Robin insult that he does not dare return home
d. Lee will finally tell us whether or not to so many people did Robin give his phone number that we can expect phone calls all week.
e. ??Lee wonders exactly when in no way at all could Robin solve the puzzle
f. ?Lee told us where on very few occasions would Robin ever agree to eat dinner
g. Lee wonders why in no way would Robin volunteer
h. Lee wonders how come at not many times would Robin eat dinner

The complete well-formedness of some of these examples, and the variability of the judgments, suggests that the sequence Q - Neg/So is in principle possible, as predicted.

2.3. why and *how come*

I turn now to the distribution of *why* and *how come*. Here, too, I rely crucially on the existence of both CP and PolP in order to explain the full range of cases.

It is generally accepted that *why* is structurally different from other *wh* proforms. For example, Rizzi (1990) suggests that *why*, unlike the other *wh*'s, can be generated in [Spec,CP] without undergoing Move α. I adapt Rizzi's general approach here, in which *why* does not originate in VP.

The complex behavior of *why* can be captured if it is taken to be a IP adjunct that moves into [Spec,PolP] when Pol is Wh and into [Spec,CP] when C is Q. The semantically related *how come* is not a XP[Wh], and therefore cannot undergo Move α into [Spec,PolP] in direct questions. But it can be an IP- or PolP-adjunct, and it moves into [Spec,CP] when C is Q.

Let us first establish the basic difference between *why* and *how come*. As the following examples show, *how come* is not a true *wh*-interrogative: it does not allow inversion, it cannot cooccur with *the hell/in the world*, and it cannot occur with *ever*, in contrast with *why* and the other interrogatives.[16]

(25) a. { why / *how come } did Robin say that

b. { why / *how come } { the hell / in the world } did Robin say that

c. { *why / how come } Robin said that

(26) a. ?whyever would you do that?

b. *how come ever you would do that?

c. *however come you would do that?

d. whenever he leaves, tell me

e. whatever did he say?

If *how come* is not a XP[Wh], it can never appear in [Spec,PolP] when Pol is Wh, because it cannot agree with Wh. On the other hand, *how come* must be interrogative in some sense, because it can appear in [Spec,CP] when C is Q, as (27) shows.

(27) I wonder how come Robin said that

It follows that *how come* must either be generated in [Spec,CP] in D-structure, or it must be an adjunct that may move into [Spec,CP]. In view of the fact that *how come* may also appear in main clauses, which lack C and [Spec,CP], I conclude that *how come* is an IP- or PolP-adjunct.

The claim that *how come* is an IP- or PolP-adjunct that moves into [Spec,CP] and that *why* is an IP-adjunct that moves into [Spec,PolP] is supported by the following facts.

(28) a. What did Robin do, and { why / how come / ??how / ?when / *where }

b. When did Robin go and $\left\{\begin{array}{l}\text{why}\\ \text{how come}\\ \text{?how}\\ \text{*where}\end{array}\right\}$

c. Robin told me what to do, and $\left\{\begin{array}{l}\text{why}\\ \text{how come}\\ \text{?how}\\ \text{*when}\\ \text{*where}\end{array}\right\}$

d. (Tell me) who left, and $\left\{\begin{array}{l}\text{why}\\ \text{how come}\\ \text{?*how}\\ \text{*when}\\ \text{*where}\end{array}\right\}$

The sentence *what did Robin do, and why?* in (28.a) means "what did Robin do, and why did he do that" or "what did Robin do, and why did he do what he did." The ellipsis in (28) must therefore include the LF representation of the *wh* in [Spec,PolP] as well as the trace that it binds; in effect, it must include the LF representation of the IP after reconstruction, as shown in (29) for (28).[17]

(29) $[_{\text{PolP}}$ what $[_{\text{IP}}$ did Robin do t]] and $[_{\text{PolP}}$ why $[_{\text{IP}}$ t_i $[_{\text{IP}}$ Robin do what]]]

On the other hand, the other *wh* words are moved into [Spec,PolP] by Move α. Consequently, if the IP is reconstructed as in (29), there will be no trace in the reconstructed IP for the moved *wh* to bind, as in **what did Robin do and how*, shown in (30). The reconstructed IP is given in boldface.

(30) $[_{\text{PolP}}$ what $[_{\text{IP}}$ did Robin do t]] and $[_{\text{PolP}}$ how **$[_{\text{IP}}$ Robin do what]**]

The unavailability of a trace in the reconstructed IP for the moved *wh* explains the ungrammaticality of the sentences in (28) that lack *why* or *how come*.[18]

By assuming that *why* and *how come* originate outside of IP we can also account for the fact that only these interrogatives allow internal Topicalization. We have already seen that Topicalization blocks extraction of a *wh* from IP, because of the topic island created by adjunction. I repeat the examples of (6).

(6) a. *I asked what, to Lee, Robin gave.
b. *Lee forgot which dishes, on the table, you are going to put.
c. *Robin knows where, the birdseed, you are going to put.

However, *why* and *how come* are generated as adjuncts outside of IP. Topicalization can apply freely below them, adjoining to IP. The following examples demonstrate that the prediction is correct.

(31) a. I asked {why/how come}, to Lee, Robin gave the book
b. Lee forgot {why/how come}, on the table, you are going to put the dishes
c. Robin knows {why/how come}, the birdseed, you are going to put in the bird feeder

There are also some interesting facts regarding *so/not* that support the analysis. Elsewhere (Culicover 1991b) I show that in expressions such as *think so/think not*, *so* can be analyzed as So+$[_{IP}$ *pro*] and *not* as Neg+$[_{IP}$ *pro*], where $[_{IP}$ *pro*] is a prosentential. I also show that Sluicing (Ross 1969), as in (32), has the analysis in (33).

(32) You told me that someone was here, but I forgot who

(33) ...but I forget $[_{CP}$ who Q $[_{IP}$ e]]

Crucially, *who* must bind a trace in the LF representation of the empty IP, which thus cannot be a prosentential. But suppose that the interrogative is *why*. If *why* originates as an IP adjunct, it does not bind a trace in the inner IP, which may then be prosentential. Consider the following examples.[19]

(34) He said he wanted to leave, but he didn't say { ?why / *how / *where / *when } so.

(35) He said that he didn't want to leave, but he didn't say { why / *how / *where / *when } not

(36) a. *He said that he did something for a strange reason, but he didn't say what so.
b. *He said that he wanted to see someone for some reason, but he didn't say who so.

Because the elliptical sentence can be *pro* just when the interrogative is *why*, it is possible to derive *why {not/so}* from the underlying structure in (37).

(37) $[_{CP}$ why$_i$ Q $[_{PolP}$ Spec {Neg/So} $[_{IP}$ t_i $[_{IP}$ *pro*]]]]

3. Extensions

3.1. Licensing subjects

There is a significant problem raised by the analysis that I have proposed. As noted by Rizzi (1990), an analysis that proposes that *wh* in Spec triggers inversion must take into account the fact that inversion does not occur with subject *wh* phrases.

(38) [$_{PolP}$ [$_{Spec}$] Wh [$_{IP}$ who$_i$ [Past do] leave]] ⇒
[$_{PolP}$ [$_{Spec}$ who$_i$] Wh [$_{IP}$ t$_i$ [Past do] leave]] ⇒
[$_{PolP}$ [$_{Spec}$ who$_i$] Wh+[Past do]$_j$ [$_{IP}$ t$_i$ t$_j$ leave]]

(39) a. who left
b. *who did leave

The ungrammaticality of **who did leave* with unstressed *did* shows that inversion does not apply in these cases. But in the current analysis, it is necessary to adjoin Infl = [*Past do*] to Wh, so that Wh can be bound. A similar problem arises in the case of negation and *so*; we get

(40) a. no one left
b. *no one did leave
(41) a. so many people left
b. *so many people did leave.

In the spirit of the analysis proposed in this paper, the obvious move to make here is to assume that PolP may be a complement of I as well as of C.[20] The sequence I - Pol allows Pol to raise to I in order to be bound without yielding the S-structure inversion pattern, as in (42).

(42) [$_{IP}$ who$_i$ [$_I$ Past do] [$_{PolP}$ Spec Wh [$_{VP}$ ...]]] ⇒
[$_{IP}$ who$_i$ [$_I$ Past do]+Wh [$_{PolP}$ Spec t [$_{VP}$ ...]]] ⇒
[$_{IP}$ who$_i$ [$_I$ Past]+Wh [$_{PolP}$ Spec t [$_{VP}$ ...]]]

After this raising, I is a composite head that can license the Wh in subject position through Spec-head agreement. Similarly for Neg and So.

To the extent that there is evidence that bears on this issue, it suggests that the *wh*, the negative and the *so* subjects are all *in situ*. As the following examples show, there is a lack of parallelism between subject and non-subject cases, suggesting that only the non-subject XP[Wh] and XP[Neg] move into [Spec,PolP].

(43) a. who will Robin see and will Lee talk to

b. who will Robin see and Lee talk to
c. *who will Robin see and [who will] talk to Lee
d. *who will Robin see and will talk to Lee
e. *who will talk to Lee and [who will] Robin see
f. *who will talk to Lee and will Robin see

(44) a. Leslie told me who Robin will see and Lee will talk to
b. Leslie told me who Robin will see and Lee talk to
c. *Leslie told me who Robin will see and talk to Lee
d. *?Leslie told me who will talk to Lee and Robin will see

(45) a. no one will Robin see and will Lee talk to
b. no one will Robin see and Lee talk to
c. *no one will Robin see and [no one will] talk to Lee
d. *no one will Robin see and will talk to Lee
e. *no one will talk to Lee and [no one will] Robin see
f. *no one will talk to Lee and will Robin see

It is of course possible to assume that the subjects move in each of these examples, leaving a trace, and that parallelism requires that the trace be a subject in both conjuncts or a non-subject in both conjuncts. But the assumption that there is no movement of the subject explains the lack of parallelism directly, with no additional stipulation on the traces.

Contraction processes also appear to treat the subject XP[Wh] or XP[Neg] as though it were *in situ*. *Will* in Pol does not contract, but *will* in Infl does contract when the subject is pronominal, or when it is *who*. Notice that contraction does not occur when the pronoun is in [Spec,PolP].

(46) a. {I/you/she/we/they} will leave
b. {I/you/she/we/they}'ll leave
(47) a. Lee will leave
b. *Lee'll leave
(48) a. Who will leave
b. Who'll leave?
(49) a. who will Lee visit
b. *who'll Lee visit
c. who[ ]ll Lee visit

These examples thus support the view that in S-structure, subject *who* is *in situ*.

Consider also Gapping. Gapping in English typically occurs in a right conjunct when the verbal sequence is identical in both conjuncts.

(50) a. Robin will eat peanuts and Lee (will eat) pistachios

b. Lee was living in New York, and Robin (was living) in London

With respect to Gapping, XP[Wh] and XP[Neg] subjects act like subjects *in situ*.

(51) a. who will eat peanuts and who (will eat) pistachios?
b. who was living in New York, and who (was living) in London?
(52) a. no man will eat peanuts and no woman (will eat) pistachios
b. no one was living in New York, and no one (was living) in London
(53) a. many people here drive General Motors cars, but no one (drives) a Pontiac
b. many people here drive General Motors cars, but who (drives) a Pontiac
(54) a. many people here would drive a General Motors car, but no one would (drive) a Pontiac
b. many people here would drive a General Motors car, but who would (drive) a Pontiac

3.2. Other considerations

I will conclude by summarizing briefly a number of other aspects of this investigation. The observation that Pol may appear external to IP or internal to IP suggests that we should find overt evidence for two Pol positions in other languages. In fact, in some languages, $[_{Pol}$ Wh$]$ not only appears internal to IP, but may have a phrasal specifier. Horvath (1985) shows that in Hungarian the landing site for interrogative *wh* in main clauses is in pre-V position. In contrast, the landing site for relative *wh* is in [Spec,CP]. Horvath also shows that the pre-V position is in general a focus position in Hungarian. This suggests that Pol can in general be a focussing head, and we should be able to find evidence for Pol as focus in other languages.

There are SVO languages with an IP-internal focus position to the right V (e.g. Swahili (M. Rochemont, p.c)). In such languages, the focus constituent can be moved into [Spec,PolP], and subsequent movement and adjunction of the heads will move the verb to the left of the focus, as illustrated in (55).

(55) $[_{IP}\ \mathrm{NP}\ [\mathrm{I}+[\mathrm{Pol}+\mathrm{V}_i]]_j\ [_{PolP}\ \mathrm{Spec}\ t_j\ [_{VP}\ t_i \ldots]]]$

For Arabic, Ouhalla (1991) has shown that there are two negative operators, one external to Tense (*maa*) and one internal to Tense (*laa*). There are two interrogative markers, as well, *?a* and *hal*. Only the former interrogative marker can appear in disjunctive questions.

(56) a. ?a Zaynab-a uy-hibbu Zayd-un ?am Laylaa
Q Zaynab-ACC 3ms-love Zayd-NOM or Laylaa
'Is it Zaynab that Zayd loves or Laylaa?'
b. *hal Zaynab-a uy-hibbu Zayd-un ?am Laylaa

Strikingly, we find that in English, a disjunctive question is compatible only with Subject-Aux Inversion, triggered by external Wh.

(57) a. Does Leslie love Lee or Robin.
b. *Leslie loves Lee or Robin↑
c. Leslie loves Lee↑

We may account for this by supposing that in English there is an internal position for Wh that yields uninverted intonation questions (see Katz and Postal 1964).

Additionally, Zannuttini (1991) has shown that both internal and external positions are available for Neg in a range of Romance languages.

This discussion raises the possibility that Pol expresses not only Wh and Neg, but more generally Focus. Consider Spanish in this regard. Laka (1990) shows that in Spanish the "emphatic" word order OVS is derived by Move α of the object into pre-IP position. She demonstrates that this NP is a focus.

(58) a. Pedro viene MAÑANA
Peter arrives tomorrow
b. MAÑANA viene Pedro
tomorrow arrives Peter

We can account for this correlation of focus interpretation with the emphatic word order by supposing, with Laka, that there is a focus position in Spanish into which a focus can be moved. In particular, in our terms we may say that Pol can be Focus in Spanish in pre-IP position, and constituents may be focussed by moving them into [Spec,PolP].

Suppose that Pol may designate focus in English as well. We predict that certain instances of movement that appear to be Topicalization are actually movements to [Spec,PolP] when Pol=Focus. On the assumption that a topic can adjoin to IP, there should be two different structures for essentially the same sequence in S-structure.

(59) $[_{\text{PolP}}\ [_{\text{Spec}}\ \text{XP}_i]\ \text{Focus}\ [_{\text{IP}} \ldots t_i \ldots\ ]]]$
$[_{\text{PolP}}\ \text{Spec Pol}\ [_{\text{IP}}\ \text{XP}_i\ [_{\text{IP}} \ldots t_i \ldots\ ]]]$

As shown, the movement into Spec does not create a topic island, while the adjunction to IP does.

In fact, it has been noted in the literature that there are two distinct Topicalization intonation contours, "topic" and "focus" (Gundel 1974). The topic intonation is the typical "comma intonation," where the topic and the rest of the sentence constitute separate intonation groups.

(60) a. To Robin, I gave a book
b. On the table, Lee put the books
c. Last year, we were living in St. Louis
d. In those days, we drove a nice car
e. Robin, I really dislike

The focus intonation is characterized by a primary stress in the topic and no break between the topic and the rest of the sentence. There can be an additional primary stress elsewhere in the sentence, as well.

(61) a. To ROBIN I gave a book/BOOK
b. On the TABLE Lee put the books/BOOKS
c. LAST year we were living in St. Louis/LOUIS
d. In THOSE days we drove a nice/NICE car
e. ROBIN I really dislike/DISLIKE

The analysis predicts, correctly I believe, that extraction from the focus Topicalization structure will be possible, while extraction from topic Topicalization will be impossible, since it creates a topic island. Hence we expect for example to have multiple Topicalization just in case the inner topic is a focus. The cases of multiple Topicalization in the literature appear to have this property.

(62) a. This book to ROBIN I gave
b. Last year in St. LOUIS we were living
c. In those days a NICE car we drove
(63) a. *This book, to Robin, I gave
b. *Last year, in St. Louis, we were living
c. *In those days, a nice car, we drove

Finally, it has been noted in the literature that Topicalization does not show Weak Crossover effects, since the topicalized constituent is not an operator that binds one or more variables. In contrast, we would expect that focus topicalization would produce Weak Crossover effects, since a focus is interpreted as an operator (Chomsky 1977). The following judgments, while delicate, appear to support the analysis.

(64) a. Robin$_i$, his$_i$ mother really appreciates
b. To Robin$_i$, his$_i$ mother gave lots of presents
(65) a. *ROBIN$_i$ his$_i$ mother really appreciates

b. *To ROBIN$_i$ his$_i$ mother gave lots of presents

I therefore conclude that in English, as in Hungarian and other languages, Pol may be Focus. In English, Focus may be external to IP.

4. Summary

In this paper I have shown that in English there are two distinct functional head positions to the left of the subject, each of which is the head of a maximal projection. The two heads, C and Pol, permit the explanation of a range of phenomena that are not amenable to a one complementizer analysis. For example, the fact that there is no *that-t* effect when *that* is immediately followed by one of a certain class of adjuncts is accounted for if empty Pol undergoes agreement with the subject trace. The occurrence of Subject-Aux Inversion in embedded Negative Inversion and *so*-Inversion sentences but not in embedded *wh*-questions has a natural account if we distinguish pure complementizers such as *that* and Q from operators such as Wh, Neg and So. The assumption that Pol is present in tensed S's but not in infinitivals allows us to explain the fact that there are only *wh* infinitivals, not negative or *so* infinitivals. The C/Pol analysis also allows us to capture some facts about the behavior of *why* and *how come* as well as some subtle differences between them.

Finally, I have proposed that PolP can appear not only as a complement of C, but as a complement of I. When it is IP-internal, [Spec,PolP] can function as the location of pre-V focus, as in Hungarian. Allowing Pol to be Focus will allow us to capture the difference between comma intonation and focus intonation Topicalization in English, and predicts that certain instances of Topicalization will not create topic islands. Finally, in Arabic and the Romance languages there is comparative evidence to suggest that external and internal positions are available for various instantiations of Pol, including Neg and Wh.

FOOTNOTES

* Portions of this material were presented to audiences at the University of Arizona, the Rijksuniversitet van Utrecht, and ESCOL. A substantially expanded discussion of many of the same issues appears in Utrecht Working Papers in Linguistics, forthcoming. For helpful discussion, criticism and specific suggestions regarding the analyses proposed in this paper I would like to thank Andy Barss, Peter Coopmans, Arnold Evers, Hans den Besten, Alec Marantz, Shigeru Miyagawa, J.J. Nakayama, David Pesetsky, Tom Roeper, Bonnie Schwartz, Frits Stuurman, Laurie Zaring, and especially Marc Authier, Heizo

Nakajima, Michael Rochemont, and Ayumi Ueyama. Naturally I am responsible for any errors.

1. I adapt the category Pol from Johnson (1989), who makes different use of it than is proposed here. For Johnson, Pol is the category of the "adverbs" *so*, *too*, and *not*. My proposal resembles several others that have appeared recently, as well. Laka (1990) proposes a head Σ for English, Spanish and Basque that resembles Pol in many respects; I will suggest a variety of additional evidence for her general proposal as well as several modifications. Ueyama (1991) has argued for a similar head in Japanese, while Koizumi (1991) proposes a somewhat different M(P) for "modal" adverbs in Japanese; the two proposals are not entirely compatible, however. Haegeman (1991) argues extensively for a Neg(P) external to IP in West Flemish, which appears to have many of the properties of Pol when Pol takes on the value Neg in my analysis. Authier (1991) suggests that CP can iterate in English, yielding superficially similar structures to those that I investigate in this paper.

2. The view that there are two adjunction sites to the left of the subject is not entirely novel; see for example Grosu 1975 and Reinhart 1981. The framework within which their arguments are couched is sufficiently different from the current one that it is not entirely clear how their evidence can be brought to bear on the current proposal.

3. Another value of C, which I will not discuss at length here, is Rel(ative). Also, Laka (1990) shows, following Klima (1964), that there is a phonologically empty morpheme that denotes affirmation and is in complementary distribution with Neg.

4. See Diesing 1990 for a discussion of V-second in Yiddish along these lines.

5. As discussed in section 3, there are two types of Topicalization, with different intonations and different structures. It is more acceptable to extract from the "focus" Topicalization structure.

6. I thank Shigeru Miyagawa for suggesting this formulation to me.

7. This assumption is not universally accepted. It is not made in Rochemont and Culicover (1990), for example, and it does not appear to be made by Lasnik and Saito (to appear). It may well be possible to replace the requirement that X^0 movement and even XP movement be structure-preserving by a requirement that adjunctions be properly licensed, along lines suggested by Fukui and Speas (1986), Hoekstra (1991) and Culicover (1991a).

8. It has been proposed that *that* may take a CP complement (Rizzi and Roberts 1989, Authier 1991); Chomsky (1977) adopts a similar approach in a earlier framework. Such a structure must be severely constrained so that illicit sequences are not generated: **that that (...)*, **who that*, **at no time who*, **at no time that*, etc.

9. It is possible to front a negative constituent without inversion, as shown by Klima (1964). I am focussing here on those cases in which the negative has

sentential scope. For discussion of the interpretive difference between Negative Inversion and ordinary Topicalization, see Klima 1964, as well as Liberman 1974 and Rochemont 1978.

10. We may take a similar approach to *so*-Inversion, illustrated in (i).

(i) So many people did John insult that he did not dare return home

We would therefore predict that extraction from a *so*-Inversion context will be grammatical, by analogy with extraction from a Negative Inversion context. The judgments are marginal at best, however, for reasons that are not clear to me.

(ii) a. Mary says that she will sell this book to so many people that she will become rich.
b. *?These are the books that Mary says that on so many tables will she put that the floor will collapse.
(iii) a. Mary says that she will read this book with so much attention that she won't hear the phone ring.
b. *?This is the book that Mary says that with so much attention will she read that she won't hear the phone ring.

11. Laka (1990, 40) proposes that Infl must move to Neg as a consequence of the following Tense c-command condition, based on a suggestion by Pollock (1989): "negation must be c-commanded by Infl at S-structure." More generally, in S-structure Tense must dominate all other inflectional elements, including Neg. If I am correct that English has both a complementizer Q and a Pol Wh then the fact that Infl does not raise to Q might constitute a problem for such an approach.

12. A not dissimilar account is given by Rizzi (1991). Rizzi suggests that in *wh*-questions I is marked [Wh]. I moves to C in order to license Spec-head agreement with a *wh* in Spec. I leave open here the question of whether there are other than notational differences between the two formulations. One apparent major difference is that by incorporating Pol into I in the form of a feature, we would lose the ability of empty Pol to license a subject trace, as discussed in section 2.1.

13. It is possible to have *wh*-infinitives in English, but not *neg*-infinitives or *so*-infinitives.

(i) a. I was wondering whether (or not) I should leave
b. I was wondering what I should do
c. I was wondering how many times I should call
d. I expected that not once would I see John
e. I expected that so many people would I meet that I wouldn't be able to count them all

(ii) a. I was wondering whether (or not) to leave

b. I was wondering what to do
c. I was wondering how many times to call
d. *I expected not once to have seen John
e. *I expected so many people to meet that I wouldn't be able to count them all

The current account crucially provides both [Spec,CP], the landing site for fronted *wh*, and [Spec,PolP], the landing site for fronted *neg* and *so*. The evidence of these examples is that infinitives simply lack PolP. In fact, it appears that Pol only cooccurs with Tense. For a similar observation about the cooccurence restrictions on certain instances of Neg in Romance, see Zannuttini 1991.

14. Possibly there is a pragmatic restriction against embedding the element that signifies a direct question. A similar restriction would rule out embedding of true imperatives, while allowing embedded subjunctives.

15. We might be able to allow the sequence Q - Wh if we require that Wh always raises to Q and functions as a bound morpheme when it is adjoined to Q. I see no independent justification for such an analysis at the moment.

16. As Pesetsky (1987) shows, *the hell/in the world* is compatible only with the sentence-initial interrogative, that is, the *wh*-phrase that takes widest scope.

(i) a. who the hell hit Mary
b. who hit who
c. who the hell hit who
d. *who hit who the hell
e. *who the hell hit who the hell

17. I leave open here the precise details of how the ellipsis is to be formally captured. For a range of views, see Sag 1976, Wasow 1972, and Williams 1977.

18. Along related lines, the following examples show that it is possible to have ellipsis in a relative clause when the relative proform is *why* or *how come*, but not when it is another relative proform, *that* or empty complementizer.

(i) a. John would not tell me the reason why (not)
b. John would not tell me the reason how come (*not)
c. *John would not tell me the way how (not)
d. *John would not tell me the time when (not)
e. *John would not tell me the place where (not)
f. *John would not tell me the thing which (not)
g. *John would not tell me the person who (not)

These examples contrast sharply with the corresponding Sluicing cases for *wh*-questions. The formal basis for the contrast is not entirely clear, however, and I leave the matter for future investigation.

19. A similar but distinct pattern holds for infinitival questions, e.g.

(i) a. ...Robin didn't know
??why to
?where to
when to
*what to
?who to
*how many to

b. ...Robin didn't know
?why not to
?where not to
when not to
*what not to
*who not to
?how many not to

I do not find the judgments stable, however, and therefore I will forego attempting to account for them here.

20. Of course, we will still have to rule out the ungrammatical examples. The obvious approach would be to extend the ECP for subject traces to cases in which inversion has applied.

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ESCOL '91 69-80

PHRASAL INPUT TO DERIVATIONAL MORPHOLOGY IN SLAVIC

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0. Introduction

This paper will examine several constructions in Slavic languages in which derivational morphology operates with phrasal input, that is, constituents which themselves have inherent syntactic structure. In other words, some elements of derivational morphology seem to take place within the syntax.[1] This can be done in a variety of frameworks, but we will see that there are certain advantages to an approach akin to Autolexical syntax (Sadock 1985).

We'll first consider participial clauses in Russian, one of the major crossroads of syntax and derivational morphology. Two plausible syntactic analyses emerge, and are then applied to deverbal nominalizations in Bulgarian, which will refine it a bit. These constructions are clearly phrasal, and derivation feels as if it is superimposed on syntax. Finally we'll consider compound adjectives in Russian whose meaning corresponds to syntactic phrases. Here derivational morphology is paramount, but the syntactic content recapitulates what we saw before.

1. Participial Clauses in Russian

Russian, like many other languages, permits the construction of participial relative clauses including all the syntactic components of, at least, roughly a VP. Russian can be taken as representative of all the other Slavic languages; these languages vary only in the precise inventory of participles available. Russian has the maximum set of four discrete participial forms; we'll return to the parameters of that set below. A garden variety participial clause is given in (1).

(1) Ja govoril s ženščinoj, *porugavšej* menja na
I$_{NOM}$ spoke with woman$_{INST}$ scolded$_{INST}$ me$_{ACC}$ at
sobranii.
meeting$_{LOC}$
'I spoke with the woman who scolded me at the meeting.'

Again, like many other languages, Russian also permits these clauses to occur before the antecedent noun, as in (2).

(2) Ja govoril s *porugavšej* menja na sobranii
I$_{NOM}$ spoke with scolded$_{INST}$ me$_{ACC}$ at meeting$_{LOC}$
ženščinoj.
woman$_{INST}$
'I spoke with the woman who scolded me at the meeting.'

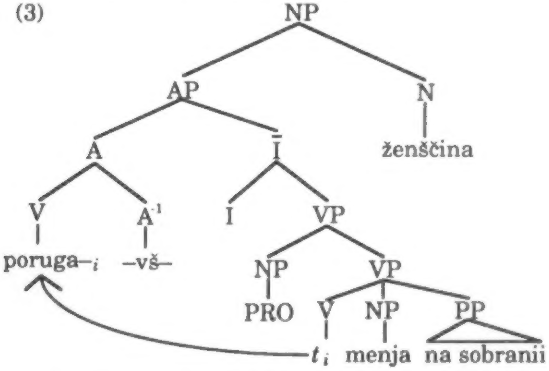
(1) and (2) differ in the configurational structure of the overall NP, but the other details are the same. Preposing the clause triggers no

grammatical changes, although of course the semantic and discourse functions of the detached participial clause in (1) are somewhat different from those of the attributive clause in (2). In this respect participial clauses are parallel to simple adjectives, which occur on both sides of nouns for similar functional reasons.

These participles are interesting because of their dual nature. They look like adjectives in terms of both morphology and syntax, inflecting like adjectives and agreeing with the head noun in gender, number, and case. However, they also display certain syntactic properties of verbs: they assign accusative Case to their objects, and take other VP complements as well. Rather than just resort to some loose generalization, e.g., "participles are the only adjectives which take direct objects", we'd prefer to find some principled formal means to capture this dual status.

These constructions can be described in terms of Baker 1988 and other recent work combining head–to–head movement with very elaborate phrase structure, as in (3), which corresponds to the preposed participial phrase in (2).

(3)



In (3) an AP modifies the head noun 'woman', itself consisting of the clause containing the participle, inserted as a verbal stem, and headed by an adjectival affix. The label A^{-1} signifies an element of category A one X–bar level below the word, which is A^0.[2] Then the V, which heads the clause, moves to adjoin to the adjective–forming affix, thus performing derivational morphology in the middle of the syntax. The trace of the verb retains all its clause–internal functions, while the verb itself becomes an adjective and is fully integrated syntactically into the higher NP.

A hard–core lexicalist might object to the very idea of syntactic treatment of such participles. Besides the considerable intuitive advantage to a syntactic account, a strictly lexical account has some trouble handling all the potential arguments associated with the verb. Consider the following example:

(4) ...nabor isxodnyx morfem i nabor pravil,
set underlying morphemes and set rules$_{GEN}$

soedinjajuščix i **vidoizmenjajuščix** èti morfemy...
combining$_{GEN}$ and form–changing$_{GEN}$ these morphemes

'...a set of underlying morphemes and a set of rules combining and form–changing these morphemes...'

On the lexical level, the participle *vidoizmenjajuščix* already incorporates an object argument, *vid* 'form'. The explicit syntactic object of that participle, *èti morfemy*, can only be associated with the verb in the syntax; we could hardly tolerate duplicate objective arguments in the lexicon. Note that a similar argument can be constructed to support syntactic derivation of deverbal nouns in Russian, since parallel examples like (5) are equally productive.

(5) vidoizmenenie ètix morfem
form–change these morphemes$_{GEN}$

Assuming, then, that syntactic derivation of participial clauses is necessary, one important question is just how much phrase structure we need within the embedded clause. I've treated it in (3) as an $\bar{I}$, with a PRO subject within VP, assuming a normal set of I components. If I is responsible for Nominative case assignment to subjects, then this I can't really be full, or else we couldn't get a PRO subject, which requires a caseless position. We could deal with that by assuming that I is incomplete, missing whatever projection is responsible for Nominative case assignment (perhaps there is no AgrP). However, note that I must be fairly rich to deal with Russian participles.

As noted above, Russian has four discrete morphological participles, which vary for what we can loosely refer to as "tense" and "voice".[3] The inventory of participles is given in (6).[4]

(6)

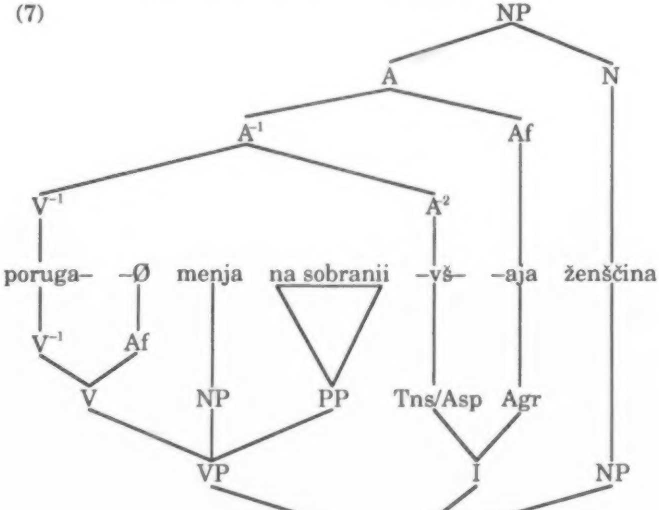
Tense Voice	Past	Present
Active	*Past Active Participle* Pf. Impf.	*Present Active Participle* —— Impf.
Passive	*Past Passive Participle* Pf. (Impf.)	*Present Passive Participle* ((Pf.)) Impf.

Traditional terminology fluctuates between referring to the participles in terms of tense, as "past" and "present", and in terms of aspect, as "perfective" and "imperfective". However, as (6) shows, the only reliable terminology is tense–based. The past active participle is formed productively for both aspects, and thus must be thought of in terms of tense, i.e., anterior taxis relative to the main verb in the sentence. Following recent GB trends, tense can be ascribed to a TnsP within I, while aspect can be determined by an AspP. These are satisfactory conditions on (3), since the participial clause can in principle draw upon most of the components of I that are present in a finite clause.

The structure in (3), however, has an intuitive defect. The participial affix is outside the clause—motivated by the fact that participles are morphological adjectives modifying nouns within NP—yet the affix is chosen based on characteristics of clause–internal I. We are forced to resort to vague selectional restrictions: the past active participle affix selects as its sister precisely those Ī's with the right kind of I. Moreover, we still have the residual problem with the PRO subject, since we're now saying that I is full enough to determine the tense and aspect of VP but doesn't license case assignment to PRO. How can we avoid these difficulties?

Another formalism found in the GB literature maps certain syntactic strings to two separate syntactic structures (e.g., clause union in DiSciullo and Williams 1987, Haegeman and van Riemsdijk 1986). Causatives act bi–clausal with respect to certain syntactic properties, while in other respects they seem to be mono–clausal. Under this approach we don't have to decide: the sentences are **simultaneously** both bi–clausal **and** mono–clausal. Since Russian participles act like both a verb and an adjective, similar logic would suggest that they are really **both** at the same time. We could capture this notion with a syntactic structure like (7).

(7)



Such a “bi–dendroid” structure has a number of advantages over the more standard GB–style analysis. First, it corresponds exactly to our intuition: the verb is doubly attached, present in both the upper and lower trees, so it serves the double function of adjective and verb. Second, we have completely resolved the Tense problem, since the participial affix is doubly attached: it's an affix, A^{-2} on the upper tree, while simultaneously functioning as the Tense element within INFL on the lower tree. Third, the elements of the lower VP are totally insulated from the upper NP: they can't move, and no NP elements can intervene—despite the relatively free word order within Russian NP's. This follows from (7), since they are not attached to the upper NP. They are akin to parenthetical elements within NP, with no structural connection. This contrasts with (3), where all are at least dominated by that NP. Fourth, the PRO subject of the participle has been eliminated by doubly–attaching *ženščina*. Fifth, the feminine singular adjectival agreement in the upper NP could conceivably be said to result from the AGR component of I. In this way we could recycle another atavism: adjectives originate as the predicates of a lower clause. But we still can't eliminate all ordinary NP–internal agreement, because determiners like ‘this’ and ‘that’ in Russian also agree for gender and number, and they could hardly function as predicates. Moreover, the case manifested by this affix is due to the upper structure, not the lower one.

The clause union analyses map each constituent to both the top and the bottom clauses, while (7) asserts that the participial phrase reflects simultaneously the propositional structure of a clause, on the lower tree, while still acting as a unitary adjective in the upper NP.

Bi–dendroid analyses of clause union have been criticized (e.g., Baker 1985: 432–34) on the grounds that they are insufficiently constrained, that we can't determine which structure controls which property. But this criticism doesn't really apply to (7), where the upper and lower syntactic structures complement each other, instead of competing for the attention of each element, and many elements are structurally involved in only the bottom structure.

At this point, the analysis represented by (7) is still just an appealing idea. Additional justification will be provided by deverbal nouns in Bulgarian.

2. Bulgarian Deverbal Nouns

Bulgarian has an interesting pair of deverbal nominalizations which are morphologically identical but syntactically distinct, as illustrated in (8) and (9).[5] Both constructions are 100% productive in forming action nominals from imperfective verbs.

(8) a) četene na knigata
reading of the book
‘reading of the book’

b) četeneto na knigata
the reading of the book
‘the reading of the book’

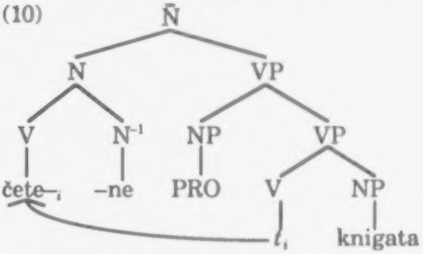
(9) a) četene knigata
reading the book
‘reading the book’

b) *četeneto knigata
the reading the book
*‘the reading the book’

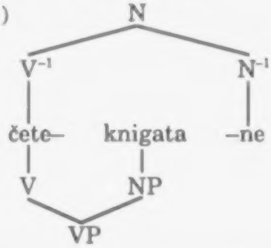
The nominal illustrated in (8) is an ordinary noun within an ordinary NP, a strictly lexical formation. It takes a definite article, it forms a plural, and its objective complement requires the all purpose preposition *na* (like a combination of English *of* and *to*). However, the nominal in (9) doesn't act like an ordinary noun. It can't take a definite article, it forms no plural, and it apparently assigns case to its objective argument, without requiring *na* as a case assigner. Thus, the NP in (9) is internally parallel to a VP, although it has the external distribution of an NP (it can be a subject, the object of a preposition, etc.). Besides the syntactic distinctions, (9) is stylistically marked, occurring chiefly in scientific, legal, or bureaucratic writing, although some Bulgarians use it freely even in everyday speech. In particular, it is often used to avoid repetition of the preposition *na*, just as we try to avoid multiple instances of *of* in English.

In Macedonian, which is very closely related to Bulgarian and shows the same distinction in deverbal nominalizations, traditional grammatical terminology distinguishes between the *deverbal noun*, as in (8), and the *verbal noun*, as in (9). We would like to develop a structural account which could capture the distinction built into this felicitous terminology. In principle, the nominal in (9) should assign case as a verb, rather than as a noun, since no other nouns can assign case without a preposition. Both mono– and bi–dendroid accounts of these examples are conceivable, as in (10) and (11).

(10)



(11)



The phrasal material built into the noun is taken here as VP, contrasting with the projection of I required for Russian participles. There are several reasons for using a smaller phrasal unit. Bulgarian has a rich system of clitics that attach to the verb; an inventory is given in (12).[6]

(12) a) the interrogative particle *li*
  b) the negative particle *ne*
  c) the future tense marker *šte*
  d) forms of the auxiliary verb and copula 'be'
  e) the Dative clitic pronouns
  f) the Accusative clitic pronouns

Most of these morphemes are clearly associated with projections within I. Since the verbal noun has no future tense, makes no interrogative form, takes no copula, and so forth, no I projections should be associated with its structure. Moreover, no Accusative or Dative prominal clitics can accompany a verbal noun, as shown in (13).

(13) a) pisane pisma 'writing letters'
b) *pisane *mu* pisma *'writing him letters'
c) *pisane *gi* *'writing them'

A convenient account of this fact is available if we assume that pronominal clitics in Bulgarian function as syntactic agreement markers associated with separate Agr projections within I, as has been suggested in recent GB literature on Romance languages (see Ouhalla (forthcoming) for discussion). Bulgarian generally acts like a Pro–Drop language for direct and indirect objects, as well as for subjects; the distribution of full vs. clitic objects is illustrated in (14).

(14) a) Vărna gi. 'He returned them.'
b) Vărna gi knigite. 'He returned **the books**.'
c) Vărna knigite. 'He returned the books.'

Clitic doubling is typical in strongly emphatic contexts. Nevertheless, syntactic object–verb agreement is looser than morphological subject–verb agreement, since examples with no clitic, as in (14c), are also possible.

Note that verbal nouns contrast with participles in Bulgarian, which require a set of I projections, since they **do** take a full set of pronominal clitics.

(15) a) učiteljat, razdavašt knigite na učenicite
'the teacher giving out the books to the students'

b) učiteljat, razdavašt mu gi
'the teacher giving them out to them'

With no I projections, no tense or aspect distinctions are possible with the verbal noun; hence, only imperfective verbs appear in this structure, since these verbs are most compatible with the semantics of an action nominal.

Both contending analyses, the GB–style structure in (10) and the Autolexical–style approach in (11), can account equally well for the features of the verbal noun that we have considered so far. However, consideration of the modifiers that occur with verbal nouns will enable us to make an empirical distinction.

(16)	navremenno	likvidirane	vsjaka	nemarlivost
	timely	liquidation	every	negligence

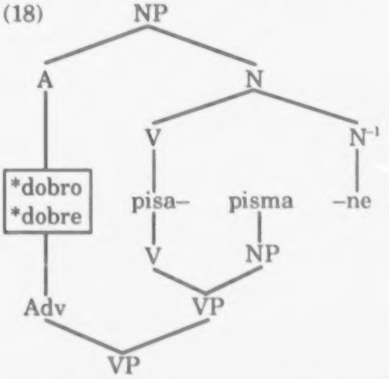
'timely liquidation of every instance of negligence'

The modifier *navremenno* in (16) is morphologically ambiguous: it could be either a neuter singular adjective or an adverb. This makes it syntactically ambiguous as well: it could be an adjective modifying the verbal noun in its host NP (nouns in *–ne* are morphologically neuter), or it could be an adverb within the underlying VP. Left–hand modifiers are natural for both NP and VP. There are a small handful of modifiers whose neuter and adverbial forms are morphologically distinct, and it turns out that **neither** form is acceptable with verbal nouns, as illustrated in (17).

(17) a) *dobro pisane pisma 'good letter–writing'
b) *dobre pisane pisma 'well writing letters'

The mono–dendroid structure in (10) offers no plausible reason for this ungrammaticality, predicting instead that adjectival modifiers ought to be possible with any verbal noun. However, the double structure provides a neat formal constraint: modifiers must be doubly attached, as in (18).

(18)



When the common left–hand modifier position is shared, the morphological form must permit double attachment, as in (18). However, if the morphological form marks it unambiguously as belonging exclusively to NP or VP, as in (17), the bi–dendroid structure is ill–formed. Other morphologically unambiguous adverbs **can** occur to the right of VP, in a position where NP wouldn't take them (so double attachment is impossible), and these are fine:

(19) okazvane pomošt po–drugarski 'rendering help in a friendly fashion'

Lexically or grammatically unambiguous NP modifiers, such as demonstrative pronouns, can't appear to the left of NP:

(20) *tova okazvane pomošt 'that rendering help'

Demonstrative pronouns naturally can't double–attach, due to the semantically defective nature of the verbal noun: as a "verb", it has no category of definiteness. Perhaps, then, the definite article fails with the verbal noun in (9b) precisely because it can't be doubly attached—VP has no Det slot.

Double attachment gives us the only decisive explanation for the non–occurrence of unambiguous modifiers, so it offers a powerful reason to prefer the bi–dendroid analysis for for its ability to merge syntax and derivational morphology.

3. Phrasal Adjectives in Russian

So far we have considered derivation within the syntax. Let's now take up the converse: syntactic structures within derivational morphology. Russian, like the other Slavic languages, forms adjectives that incorporate phrasal structures. This lexical, not syntactic process is quite productive. A sampling of adjectives corresponding to PP's are given in (21), while (22) illustrates adjectives based on A–N combinations.[7]

(21)	bezličnyj 'without personality'	bez lica 'without a face'
	dovoennyj 'pre–war'	do vojny 'before the war'
	nastol'nyj 'table–top; reference'	na stole 'on the table'
	okoloušnyj 'parotid'	okolo ušej 'near the ears'
	otglagol'nyj 'deverbal'	ot glagola 'from a verb'
	poputnyj 'passing, incidental'	po puti 'along the way'
	zarečnyj 'situated on the other side of the river'	za rekoj 'beyond the river'

(22)	dlinnošeij 'long–necked'	dlinnaja šeja 'long neck'
	milovidnyj 'nice–looking'	milyj vid 'nice appearance'
	novobračnyj 'newlywed'	novyj brak 'new marriage'
	sedousyj 'gray–mustached'	sedye usy 'gray mustache'
	širokoplečij 'broad–shouldered'	širokie pleči 'broad shoulders'
	staromodnyj 'old–fashioned'	staraja moda 'old fashion'
	tverdogolovyj 'hard–headed'	tverdaja golova 'hard head'

Many of the prepositions in (21) also occur as prefixes, especially with verbs, but some do not; *okolo* is a particularly clear example. Moreover, some of the meanings instantiated don't occur with prefixal use of the prepositions, as with *po* in (21). It would be artificial and uneconomical to recapitulate all prepositions as prefixes; since the initial morphemes in (21) look like prepositions, it is better to let them remain prepositions, even though we are forced to reckon with word–internal syntactic structure. Some of the examples in (22), those compounds pertaining to body parts, show no overt derivational suffix; the standard treatment posits a zero adjectival suffix parallel to the overt suffix found with other Adjective–Noun compounds.

Phrases occur within nouns and verbs as well. We can find numerous sets of adjective/noun/ verb parallel to (23).

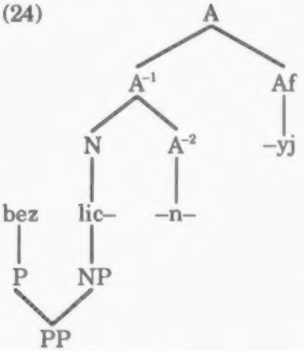
(23) bez lica 'without face'

A: bezličnyj 'without personality'
N: bezličie 'lack of personality' [cf. bezličnost' 'lack of personality']
V: obezličit' 'depersonalize, deprive of personality'

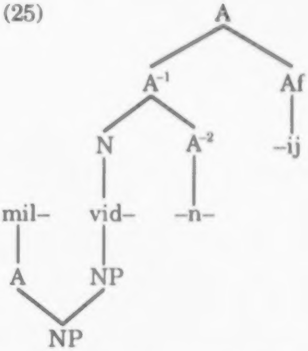
All three words are based on the same underlying PP: note the absence of the adjectival *–n–* suffix in the noun and verb, and the existence of a parallel deadjectival noun *bezličnost'*, which retains the adjectival suffix *–n–*.

What these compounds have in common with participles and verbal nouns is that a derivational affix is attached to a phrasal constituent of some sort. The difference is that participles and verbal nouns preserve the internal case relations of the phrase, while compound adjectives show no trace of case marking.[8] Let's see how a bi–dendroid approach provides a congenial means for analyzing these compounds.

(24)



(25)



The only problem to explain here is actually a non–problem: the absence of inflectional morphology traceable to the lower syntactic structure. The nominal elements in the lower phrases are naturally excluded from inflection, as they serve as input to derivational morphology; Russian obeys the generalization that inflection stands outside of derivational morphology. In much the same way, we would be surprised to find a finite verbal ending inside a participial suffix. As for the first element of these compounds, prepositions don't inflect in any case, so nothing unusual happens to them in compounds. However, adjectives do inflect in NP's, so it is worth considering why they fail to do so in compounds, if they simultaneously belong to NP on the lower structure.

It is probably sufficient to observe that the first element in a compound also stands inside derivational morphology, and is therefore ineligible to inflect. However, we might also observe that no case is assigned to the lower NP, since it stands in no further syntactic structure. Russian is an inflectional language, bundling case, number, and gender into one morpheme in nominal parts of speech. Without case assigned, the morpheme can't realize its other constituents, and the adjective can't inflect. As a result, it defaults to the thematic vowel *–o–*, which is also found in coordinate A–A and N–N compounds without internal syntactic structure, as in (26).

(26) čern**o**belyj 'black–and–white'
istorik**o**–političeskij 'historical and political'

Phrasal adjectives manifest internal syntactic relations within their lexical structure, and any analysis must incorporate this syntactic structure.The formalism adopted above is a natural and intuitive mechanism for their description.

4. Conclusion

We have seen that while Russian participles and Bulgarian verbal nouns are formed through derivational morphology, they are nonetheless essentially phrasal in nature. Simultaneous mapping to two structures, although a powerful and as yet relatively unconstrained formal device, is the most natural and straightforward mechanism for capturing the properties of these constructions. While it might be possible to maintain a lexical account of participles, the phenomenon of double attachment demonstrated for Bulgarian verbal nouns provides powerful evidence that this approach is fundamentally correct. And once the door is open to bi–dendroid structures, there is no reason to avoid them in other cases, such as the analysis of subordinate compounds which exhibit both derivational and syntactic relations.

FOOTNOTES

[1] A lot of older work in syntax did just this sort of thing, e.g., most of the initial generative work on nominalizations in English. Call it atavism, but we shouldn't turn our backs on earlier intuitions. Cf. Chomsky's (1982: 316, fn. 6) astonishingly wistful lament for the excitement of earlier analyses of just such data as considered here: "It is worth noting that as theories of grammar have become more restrictive over the years, thus enhancing explanatory depth in some domains, certain topics that had received a suggestive and sometimes illuminating analysis in terms of less constrained theories have in effect been abandoned... More recent work has in effect abandoned the attempt to give a principled account of such cases (which were a staple of earlier work), resorting to lexical rules that are hardly more than descriptive statements of the problem to be solved... But one should, I think, bear in mind the more interesting possibilities explored in earlier work... with an eye towards the possibility of recapturing earlier explanatory options that may express genuine insights that have been lost."

[2] This word–internal labeling is not used in Baker 1988, and it deviates from the word–internal labeling used by Sadock 1985.

[3] In a scrupulous treatment, tense should be replaced with taxis, which might be regarded as a contextual variant of tense here.

[4] In this table, parentheses indicate limitations on productivity; double parentheses refer to even stricter limitations; and '—' signifies the total absence of a form.

[5] In this respect Bulgarian is strongly reminiscent of English!

[6] When the clitic group precedes the verb, the complementizer *da* also cliticizes to it. However, when the clitic group follows the verb, *da* remains in its place. Presumably verbs raise through the I complex, gathering morphemes along the way, and the whole cluster of verb + I morphemes may subsequently raise to C to tak in *da*.

[7] Other combinations occur as well, e.g., Adverb–Adjective and Adverb–Verb: *sveževybrityj* 'freshly shaven', *novopriezžij* 'newly

arrived', *maloverojatnyj* 'little believable', *vysokopostavlennyj* 'highly placed'.

[8] A very few examples retain some sporadic case marking, as noted by Chvany 1977: *nikčemnyj* 'useless', *potustoronnij* 'located on the other side', *sijuminutnyj* 'of the moment', etc.

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ESCOL '91 81-92

FORMAL GRAMMAR AND THE ACQUISITION OF COMPLEX SENTENCES

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There has been a great deal of recent debate about the process by which a child acquires her grammar. One standard view is that the acquisition of syntax involves some combination of lexical acquisition with parameter setting and/or rule acquisition. This view embodies what Pinker (1984) has dubbed the "continuity assumption": that there is no fundamental change in form among the grammars in the child's sequence of hypotheses. Alternatively, it has been suggested that in addition to the mechanisms allowed under continuity, the child's knowledge of substantive principles of universal grammar undergoes maturation (cf. Felix 1984). A restricted version of the maturation view has also been proposed wherein various components or constructs of universal grammar remain unavailable until certain ages. Such late emergence has been suggested to apply to the existence of functional categories by Radford (1989) among others, and to the formation of A-chains by Borer and Wexler (1987).

In this paper, I propose that instead of postulating maturationally induced changes in the child's substantive grammatical knowledge, we can explain stages of syntactic development by positing changes in the formal, as opposed to substantive, universals of grammar in the sense of Chomsky (1965). In particular, I argue that if the formalism of Tree Adjoining Grammar (TAG) is used as a meta-language in which substantive grammatical principles are expressed, then the acquisitional difficulties that children experience over a wide range of constructions can be reduced to the unavailability of the single formal operation of adjoining. The use of adjoining is more computationally complex than the other operation of the TAG formalism, substitution. This proposal demonstrates, then how computational factors can account for intricate patterns of data in syntactic acquisition.

The paper will proceed as follows: I first review a number of results from the literature concerning the acquisition of a number of complex (i.e. multi-clausal) constructions in English, in particular relative clauses, control and raising. For each of these constructions, we will see that children experience certain systematic difficulties, and I outline the different sorts of proposals that have been made to explain and characterize these difficulites. Then, after giving a brief description of the TAG formalism, I demonstrate how the formal machinery of TAG allows us to provide a unified explanation for the acquisitional problems discussed. In the final section, I consider the more complex case of the acquisition of Wh-movement. I show how the assumption of the absence of adjoining in children's grammar likens the child's analysis of Wh-movement to that employed in the adult grammar of (vernacular) German and accurately predicts a complex range of data.

1 Some Problematic Constructions

1.1 Relative Clauses

Tavakolian (1981) demonstrates an interesting asymmetry in the syntax of children's relative clauses. Children between the ages of 3 and 5 years are presented with sentences containing a transitive verb with a relative clause attached either to the subject or object NP as in (1).[2]

(1) a. The sheep_1 [that t tickled the rabbit_2] kissed the monkey_3

b. The sheep_1 kissed the monkey_2 [that t tickled the rabbit_3]

After hearing such a sentence, the child is asked to act out the events which were described, using a set of stuffed animals. The question being investigated is this: Which NP arguments does the child take to be associated with which verbs?

In the case of relative clauses attached to the subject NP as in (1)a, the children performed quite well uniformly. Children in all of the age groups, spanning 3 to 5 years, responded correctly with an average rate of 78% correct.

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However, in cases where the relative is attached to the object NP as in (1)b, the performance is rather degraded. At the age of 3 years, practically none of the children respond with an answer appropriate in the adult grammar, and even at the age of 5, they perform only at 37.5% correct. Extremely interesting, though, is the practical unanimity of the character of the incorrect responses. The children correctly interpret the subject NP as the subject of the matrix verb *kissed*, but incorrectly assign this NP the subject role of the verb embedded within the relative clause, i.e. *tickled*.

In order to explain these data, Tavakolian proposes that the grammar of young children analyze relative clause configurations, and more generally multiple clause structures, as instances of conjoined clauses. Under this analysis, the child finds the first NP-V-NP sequence of the input and assumes it to form a simplex sentence. The next sequence of V-NP is analyzed as another sentence, this time with an empty subject position, and this sentences is attached to the first by coordination. Thus, any NP-V-NP-V-NP sequence will be analysed by the child as in (2).

(2) $[_{IP}\ [_{IP}$ NP$_i$ V NP$]\ [_{IP}\ e_i$ V NP$]]$

As is typical for such cases of VP coordination, the empty subject of the second clause is taken to be coreferential with the first.

Let's see how this conjoined clause analysis works on the two cases of relative clauses we have considered. For the relative clause attached to the subject NP, i.e. as in example (1)a, the child would assign the following structure:

(3) $[_{IP}\ [_{IP}$ the sheep$_1$ that tickled the rabbit$_2]\ [_{IP}\ e_1$ kissed the monkey$_3]]$

Though this structure is radically different from the structure assigned by the adult grammar, the thematic relations work out identically. Tavakolian suggests that since the act out task does not allow us to distinguish predications expressed in relative and conjoined clauses, children's performance appears identical to adults in this condition, despite gross grammatical differences.

When the relative clause is instead attached to the object NP by the adult grammar, i.e. as in example (1)b, the structure assigned is:

(4) $[_{IP}\ [_{IP}$ the sheep$_1$ kissed the monkey$_2]\ [_{IP}$ that e_1 tickled the rabbit$_3]]$

This time, the radical differences between this structure and that assigned by the adult grammar do lead to differences in the assignment of thematic relations which are observable in the act out task. The child takes the matrix subject *the sheep* to be the subject of the relative clause verb *tickled* as a result of the rules for the interpretation of empty subjects in coordination.

Lebeaux (1988) presents a more theoretically sophisticated analysis of Tavakolian's data. He assumes that universal grammar includes two operations which may occur during the course of a derivation: move-α and adjoin-α. This latter operation is responsible for the introduction of adjuncts into the phrase structure in the transition between DS and SS. Lebeax proposes that children lack the adjoin-α operation, and therefore, they are unable to construct the adult analysis of relative clauses. Children instead have a grammar which analyzes relative clauses in a manner similar to the proposal of Bach and Cooper (1978) for Hittite, i.e. they are conjoined and attached at the root IP. This analysis differs from Tavakolian's in distinguishing relative clauses and other adjuncts from embedded clauses, a distinction we will see is appropriate given the data on control we now turn to.

1.2 Control

Goodluck (1981) examines the phenomenon of control in two types of sentences: ones in which PRO is contained within an adjunct as in (5), and others where it appears within a complement clause as in (6).[3]

(5) Cookie Monster$_i$ touches Grover [after PRO$_i$ jumping over the fence]

(6) a. Cookie Monster tells Grover$_i$ [PRO$_i$ to jump over the fence]

b. Grover$_i$ was told by Cookie Monster [PRO$_i$ to jump over the fence]

For adult speakers of English, the controller in cases of adjunct control must be the subject of the clause to which the adjunct is attached as indicated by the coindexation in (5). When PRO appears within the embedded infinitival complement of a verb like *tell* in its active form as in (6)a, it is obligatorily controlled by the object of the higher verb. When the verb is passivized, however, PRO is controlled by the derived subject as in (6)b, perhaps via the trace in object position.

In Goodluck's experiments, children between the ages of 4 and 6 are presented with examples similar to these and are asked to perform an act out task. In the case of adjunct control, the examples involve adjuncts headed by temporal prepositions like *before* and *after* as these are likely to be acted out along with the predication expressed in the main clause. The percentage of cases in which children employ subject control for each of the three cases in (5) and (6) is given in (7).

(7)

	Condition		
Age	Active Temporal	Active *tell*	Passive *tell*
4	45.0	5.0	86.7
5	60.8	2.5	91.7
6	67.5	17.5	90.0

In cases of complement control, even the youngest group of children, 4 years in age, performs nearly perfectly. When the matrix verb is active, they overwhelmingly object control, yet when the matrix verb is passive, they correctly control PRO by the derived subject. However, in the cases of adjunct control, the performance is quite degraded. There is no decisive pattern in their responses demonstrating either uniform application of subject or object control, though there is some sign of a tendency toward the adult pattern of subject control by age 6.

Goodluck takes these results as evidence for the claim that children are sensitive to c-command relations in even the early stages of their grammatical development. She argues that the fact that PRO must be controlled by a c-commanding NP explains why children do not have difficulty in the passive case in (6)b: the NP within the *by*-phrase does not c-command the object clause and hence cannot control it. In order to explain the asymmetry between adjunct and complement control, she suggests that children allow temporal adjuncts to be attached to VP or to IP, instead of only to IP as in the adult grammar. In such a position, an adjunct would be c-commanded by an NP object which may then serve as a controller to a PRO within the adjunct. Goodluck leaves open, however, the questions of why the child would initially make the assumption that both VP and IP attachments are possible for such adjuncts, as well as how a child would come to realize that the VP attachment was not possible despite the lack of negative evidence.

1.3 Raising

The last construction I'll discuss in this section is raising. Wexler and Chien (1988) describe a picture identification task for sentences involving the raising verbs *appear* and *seem*. The experimental materials include these verbs in both their raised and non-raised forms as in (8)a and b respectively.

(8) a. Mary seems to John [to be sad]
b. It seems to John [that Mary is sad]

Though certain aspects of Wexler and Chien's results prove difficult to interpret, such as the sharp contrasts between on the one hand cases like those in (8) and on the other cases where the *to* PP has been topicalized, the general trend as exhibited in their within-subject analysis is fairly clear: children, at least up through the age of 6, experience great difficulty only with the raising examples.[4]

Additional support for this absence of raising in early child grammars comes from the discussion in Pinker (1984). Pinker claims the existence of subject-to-subject raising verbs in the early language of Adam and Eve in the Brown corpus. However, the examples of verbs which he claims exhibit raising, *gotta, may, will, gonna* and *shall*, can all be analyzed as modals and can be argued to involve

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no movement of the subject NP, but instead some sort of theta role transmission to the canonical subject position.[5] By contrast, "real" raising verbs such as *seem*, *appear* and *be likely* don't appear at all in the speech of young children. In fact, my preliminary check of the Childes database has failed to turn up an undisputable example of raising in any child under the age of 5.

How can the difficulty of raising be explained? Within Government-Binding theory, raising has been analyzed as a case of so-called A-movement, i.e. movement of an element from one argument position into another. In (8)a, the NP *Mary* is moved from the subject position of the embedded clause into its surface position as the subject of the matrix verb *seems*. Borer and Wexler (1987) investigate the acquisition of instances of other constructions involving A-movement, in particular those involving passive and ergative verbs. On the basis of the pattern of difficulties which children experience, Borer and Wexler propose that children lack the ability to form A-chains, probably until sometime around the age of 6 at which point they suggest that this ability becomes available through a process of maturation.[6] Thus, if Government-Binding theory is correct in conflating raising with these other instances of A-movement, then Borer and Wexler's proposal of the late availability of A-chain formation provides an explanation for why raising should be difficult for young children.

2 Towards a Unified Explanation: Tree Adjoining Grammar

In the discussion in the previous section, we saw associated with each acquisitional difficulty a separate explanation for why and in what way that particular construction proves difficult. Difficulty in relative clause constructions was related to the lack of the adjoin-α operation, in adjunct control constructions to the possibility of VP attachment of temporal adjuncts, and in raising to the inability to form A-chains.

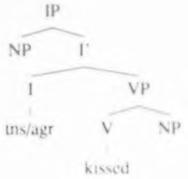
Since these problems dissipate at roughly the same age, approximately 6 years,[7] it seems desirable to relate these difficulties to a single cause.[8] Additionally, the authors who make these proposals do not offer any explanation for why it is these difficulties that children have and not others. In this section, I show that if we assume that phrase structure is constructed using the formal system of Tree Adjoining Grammar (TAG), then each of the acquisitional problems dicussed in section 1 can be traced to the fact that the TAG derivation for the construction requires the use of the adjoining operation. I also suggest that it is the increased computational load associated with this formal operation makes these cases more difficult for young children to process. Before proceeding with the details, however, I first turn to a description of the TAG formalism and its use in the expression of a grammatical theory.

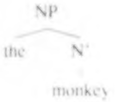
2.1 The Basics of TAG

TAG is a constrained grammatical formalism which has been proposed as a candidate for the meta-language for the expression of principles and constraints on the grammar of natural languages (Joshi 1985). It allows the statement of perspicuous linguistic principles by factoring out recursion from the statement of local co-occurrence restrictions. Thus, the role of TAG in a linguistic theory is as a theory of how phrase structure is composed. I should point out emphatically that TAG does not replace or reduce the need for a set of substantive principles of grammar. On the contrary, it provides a setting in which such principles can be expressed precisely. Thus, in the context of a modular principles and parameters theory of grammar such a GB theory, we can view TAG as an additional module of the theory, and slightly adapt the the principles of the existing modules to be expressed in the terms which TAG allows.[9]

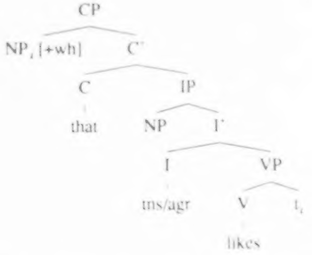
There are two main ideas in how a TAG-based theory accomplishes its linguistic description. The first of these lies in the fact that all of the grammatical constraints and operations are localized within small, non-recursive chunks of phrase structure called *elementary trees*. The linguistic intuition behind these elementary trees is that they are simple clausal structures containing positions for all of the arguments of a single predicate, much like the kernel sentences of Chomsky (1957). I tentatively propose that a single elementary tree consists of the projection of exactly one lexical head optionally along with the projections of the associated functional heads, i.e. those heads which form an extended projection of the lexical head in the terms of Grimshaw (1991). So, an elementary tree containing the lexical projection of a V^0 may include the projection of I^0 as well as that of C^0. Some sample elementary trees are given in (9) and (10).

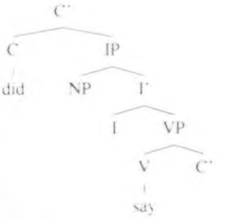
(9)





(10)

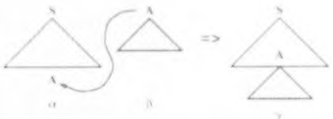




Notice that in the leftmost tree in (10), we see the application of the rule of move-α within the domain of the elementary tree headed by the lexical head *likes*. Here we have movement of the NP object into the specifier of CP position, an typical instance of English Wh-movement. In addition to the application of principles, such as the ECP, to traces of movement, we also require that all instances of transformational movement be limited to the domain of a single elementary tree.

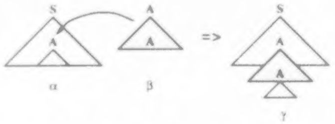
Note that the argument positions of the lexical verb *kissed* are not filled in the leftmost tree in (9). This is due to our condition on the size of elementary trees: only one lexical head may appear in each. The N^0 heading the NP in object position cannot co-occur within the same tree as the verb of which it is an argument, it follows that they must form separate elementary trees. Therefore, the formalism must provide some way in which these pieces can come together. This constitutes the second basic idea of TAG: elementary trees are combined into larger phrase structural representations using two formally defined operations. The first of these operations is *substitution* in which one tree rooted in a node labelled *A* attaches at the frontier of the other at a node also labelled *A*. This is shown schematically in (11).

(11) Substitution of β into α:



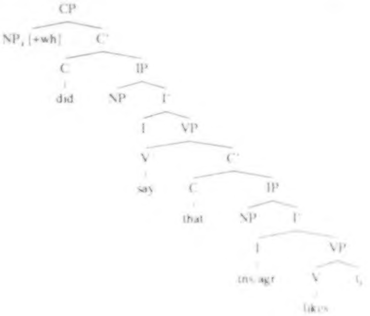
Using the trees in (9), we can apply substitution of the NP tree into the object NP position of the IP tree, and thereby fill the argument position. The second operation of *adjoining* is somewhat more complex. Adjoining requires an elementary tree of a specific type, called an *auxiliary tree*, which has at its root a node labelled A and also a node along its frontier labelled identically called the *foot node*. During adjoining, an auxiliary tree is inserted within the body of another tree at a node also labelled A by removing the subtree dominated by A in the source tree, attaching the auxiliary tree, and reattaching removed subtree at the foot node of the auxiliary. This is illustrated in (12).

(12) Adjoining of β into α:



We can use the adjoining operation to combine the trees in (10). The right tree, an auxiliary tree with root and foot C′, adjoins into the left tree at the node C′ to produce the structure in (13).

(13)



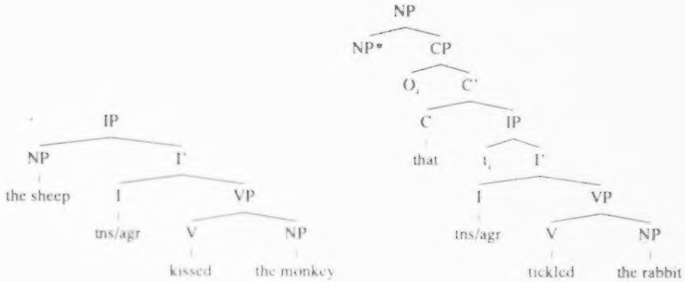
Note that through the adjoining, that the dependency between the moved wh-element and its trace in the elementary tree in (10) is stretched. In this way, TAG allows for the derivation of unbounded dependencies without the use of intermediate traces.[10] The adjoining operation is used generally in constructions involving inter-clausal movement as well as in the derivation of adjunct structures.

2.2 Explaining the Data

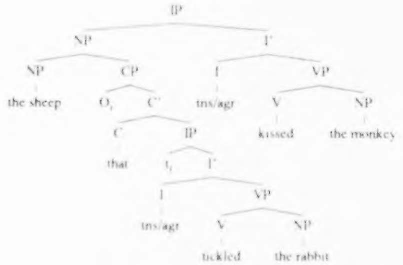
Armed now with the formal apparatus of TAG, we can return to the acquisition data. I will make the following proposal: young children lack the ability to perform the adjoining operation in building phrase structure representations.[11] This proposal makes the prediction that any construction whose derivation requires the use of the adjoining operation will be problematic until such time as the operation becomes available. Notice that this relieves us of the necessity of positing changes or maturation in substantive grammatical principles. Even young children, on this view, possess full-fledged versions of grammatical principles. However, when they are unable to construct the "correct" representations, the application of these same universal grammatical principles can yield different results with respect to interpretation.

In this light, let us reconsider the constructions discussed above. Relative clauses, as adjuncts, are introduced into a tree via the application of the adjoining operation. Thus, example (1)a above with a subject relative clause is derived by adjoining the relative clause tree in (14) into the elementary tree for the transitive verb *kissed* at the subject NP node to yield the structure in (15).[12]

(14)


IP
NP
the sheep
I'
I
tns/agr
VP
V
kissed
NP
the monkey
NP
NP*
CP
O$_i$
C'
C
that
IP
t$_i$
I'
I
tns/agr
VP
V
tickled
NP
the rabbit

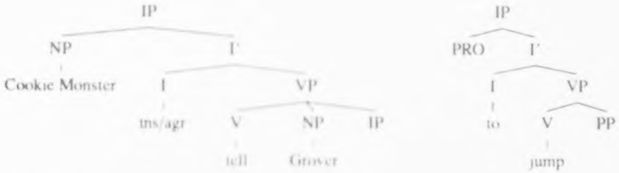
(15)


IP
NP
NP
the sheep
CP
O$_i$
C'
C
that
IP
t$_i$
I'
I
tns/agr
VP
V
tickled
NP
the rabbit
I'
I
tns/agr
VP
V
kissed
NP
the monkey

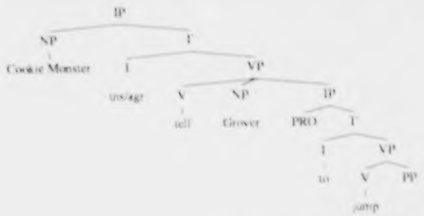
If a child lacks adjoining, she will be unable to perform this derivation and will find this construction problematic. If we assume that the child does possess the ability to handle some types of conjunction which do not rely on adjoining, then following Tavakolian and Lebeaux, we predict the asymmetry in her performance between subject and object attached relatives.

In the derivation of the control constructions, there is a difference in the operations required for the complement and adjunct cases. The derivation of a temporal adjunct as in example (5), like the relative clause example just considered, requires the use of adjoining, and hence is correctly predicted to be problematic. A structure different from the adult representation is built, and thus the application of the principles of control seems to go awry. In contrast, infinitival complements as in the examples in (6) can be generated using only substitution. Thus, example (6)a can be constructed by substituting the right tree in (16) into the left one, producing the structure in (17). Since this structure can be built by the young child, the application of the principles governing the assignment of control relations yields the same interpretation as that of the adult grammar.

(16)

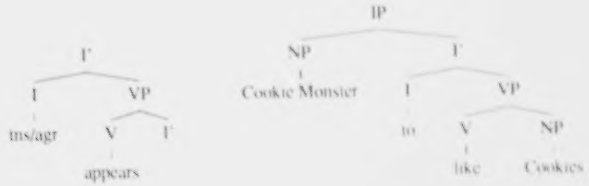

IP
NP
Cookie Monster
I'
I
tns/agr
VP
V
tell
NP
Grover
IP
IP
PRO
I'
I
to
VP
V
jump
PP

(17)

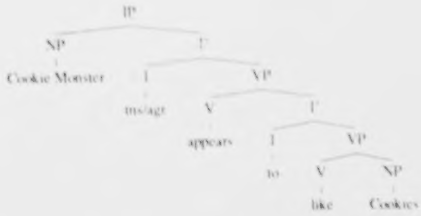

IP
NP
I'
Cookie Monster
I
VP
tns/agr
V
NP
IP
tell
Grover
PRO
I'
I
VP
to
V
PP
jump

Finally, we consider raising. As I mentioned above, all instances of inter-clausal movement necessarily require the use of adjoining. Thus, the derivation of the raising example like *Cookie Monster appears to like Cookies* uses the trees in (18) and produces the result in (19) via adjoining at the I' node in the tree on the left.

(18)


I'
I
VP
tns/agr
V
I'
appears
IP
NP
I'
Cookie Monster
I
VP
to
V
NP
like
Cookies

(19)


IP
NP
I'
Cookie Monster
I
VP
tns/agr
V
I'
appears
I
VP
to
V
NP
like
Cookies

Constructions involving the non-raised versions of raising verbs, as in example (8)b, can be derived using only substitution, and hence these are rightly predicted to be possible for the child.

I would like to close this section with some general comments concerning the nature of the explanations that I have provided. The hypothesis that children are unable to perform adjoining makes certain very strong predictions concerning which constructions are likely to be problematic for the young child. However, this no adjoining hypothesis says nothing about what children will actually do when they are presented with the problematic constructions, but only that they won't be analyzed as they are in the adult grammar. In the case of relative clauses, I have simply adopted the Tavakolian/Lebeaux suggestion that children instead conjoin the problematic clause. Like the original authors, I have given no explanation for why the children proceed to analyze relative clauses in this way, except to say that whatever analysis they employ, it must not utilize the adjoining operation.[13] What needs to be provided is an additional theory which specifies exactly how children come to choose the phrase structural analyses for the data at hand that they do within the limits of the formal systems that they can employ.

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3 A More Complex Case: Wh-movement

I will now apply the hypothesis that children lack adjoining to the case of wh-movement. Kroch's (1989) analysis of this construction in a TAG-based grammatical theory distinguishes two clases of distinguishes two classes of Wh-movement, clause internal as in (20)a and inter-clausal as in (20)b.

(20) a. Who does Felix like?
b. Who did Tom say that Felix likes?

The first of these will be entirely localized within a single elementary tree and will therefore not require any of the TAG machinery for its derivation. In contrast, inter-clausal movement can only be derived using the adjoining operation, as we saw in the derivation of structure (13). Therefore, the hypothesis I have been advancing makes the predication that children should only allow local Wh-movement until their grammars permit adjoining.

In fact, recent studies of Wh-movement acquisition suggest that something like this is true for children of ages comparable to those exhibiting the phenomena discussed above. De Villiers, Roeper and Vainikka (1990), henceforth DRV, discuss experiments concerning children's interpretations of wh-questions where the extraction has taken place out of a wh-island as in (21).

(21) How did Big Bird ask who to help?
(22) a. Initial Answer: With a big shout
b. Medial Answer: Cookie Monster

In the adult grammar, the only possible interpretation of (21) elicits an answer to the initial wh-word *how* like the one given in (22)a, where *how* is interpreted as modifying the matrix verb *help*. Interestingly, DRV found that children between the ages of 3;7 and 5;0 most often respond with an answer of the form in (22)b. That is, they respond to the subordinate wh-element *who* as though it were the main question operator. In DRV's results, there is some variation in the strength of this effect depending on the type of the upper and lower wh-elements, whether argument or adjunct, but the general pattern of responding to medial wh-elements is quite clear.

To explain this strange result, DRV tentatively suggest that young children utilize an analysis of wh-movement similar to the one described by McDaniel (1989) for certain varieties of German. These German dialects lack long-distance wh-movement, but instead employ a partial movement strategy in which the wh-element moves to the front of its clause, i.e. the local specifier of CP, and places invariant scope markers of the form *was* in the specifier of CP positions in all of the higher clauses. An example is shown in (23).

(23) Was glaubst du, welches Buch Hans gelesen hat?
What believe you which book read has
Which book do you believe Hans read?

DRV argue that children answer the medial wh-element *who* in (21) because they interpret it as the "real" questioned element, whereas they take *how* to be a scope marker, parallel to the German *was*. This proposal is supported by elicited production data from Thornton (1990).[14]

(24) a. What do you think where the marble is? (Kelly 3;11)
b. Who do you think who Grover wants to hug? (Tiffany 4;9)
c. What do you think which animal says "woof woof"? (Tiffany 4;9)

These data appear to have structure exactly parallel to the German case in (23), i.e. local movement of a wh-expression together with a "small" wh-scope marker occupying the matrix specifier of CP position.

DRV are left with explaining why children are unable to perform such long-distance movement, yet are still able to do local movement as in sentences like (20)a. This seems a particularly difficult dilemma in the face of current theories of movement, such as that of Chomsky (1986) in which even local wh-movement takes place in multiple steps. However, with the hypothesis that children lack adjoining, the reason for this distinction is clear. Derivations of cases of interclausal movement necessarily utilize adjoining and are therefore impossible, whereas derivations of local movement structures, no matter how complex the movement within the elementary tree, do not require this operation.

Now, how do we explain the possibility of the German-type partial movement construction? Let us suppose, as we must, that such constructions are derived using only the operation of substitution. Then, we can say that the presence of the scope marker in the higher clause results from the inheritance of a feature that is passed up during the application of substitution. In order to prevent the distinction between adjoining and substitution from becoming vacuous, we assume that only a bounded amount of information may be contained in any such feature. That is, these features can take their value only from some bounded set of possibilities. Linguistically, this translates into the following prediction about this analysis of partial wh-movement constructions: Scope marking wh-elements must be closed class.

This prediction seems to be borne out. Ungrammaticality results if we use an open class wh-expression in the scope marker matrix spec of CP position as is seen in (25).

(25) a. * Welches Buch glaubst du, was Hans gelesen hat?
which book believe you what read has
b. * Welches Buch glaubst du, welches Buch Hans gelesen hat?
which book believe you which book read has

Sentences like (26) seem to pose a problem since they involve the copying of an entire prepositional phrase to the scope marker position.

(26) Mit wem glaubst du, mit wem Hans gegangen ist?
with whom believe you with whom gone is
With whom do you believe Hans went?

I claim that this problem is only apparent. The prepositional element *mit* as well as the wh-element *wem* are both closed class, so can be passed up through some, albeit richer, feature value. However, if we replace the closed class wh-expression *wem* by an open class expression, as in (27), ungrammaticality results.

(27) a. * Mit welchem Mann glaubst du, mit wem Hans gegangen ist?
with which man believe you with whom gone is
b. * Mit welchem Mann glaubst du, mit welchem Mann Hans gegangen ist?
with which man believe you with which man gone is
With which man do you believe Hans went?

Therefore, the operation of substitution seems to be sufficient for the derivation of the adult German partial wh-movement structures. Whether the child English constructions obey this closed class restrictions remains open for further work.

4 Conclusions

I have argued in this paper that positing a single formal distinction between the grammatical systems of children and adults, the absence of the operation of adjoining, gives rise to a uniform account of which constructions pose difficulties in the acquisition of syntax. We have seen, in particular, difficulties in the acquisition of relative clauses, control, raising and wh-movement which are explained under this proposal. The absence of this formal operation can be seen as deriving from the computational demands that it imposes upon the child's grammatical system. If a structure is composed using only substitution, its decomposition into its constituent elementary trees is a significantly easier task than if we allow adjoining as well since it only requires our "discecting" one continous sequence of words, rather than two discountinous sequences (cf. (11) and (12)). Thus, the fact that a child uses only substitution, results from the scarcity of her computational resources at this early period of linguistic development.

One particularly important aspect of this proposal is that it does not require us to stipulate any differences between the substantive grammatical principles in child and adult linguistic competence. This contrasts with the proposals of Borer and Wexler (1987), and De Villiers, Roeper and Vainikka (1990), who proposed that children are unable to perform A-movement and long-distance A'-movement respectively. I suggest that such proposals are undesirable in light of evidence that children learning French are able to employ movement operations such as verb raising to INFL very early on (Pierce and Deprez 1990). I take the fact that the no-adjoining hypothesis allows us to dispense with such stipulations to strengthen its position even further.

FOOTNOTES

1. I would like to thank the following for their valuable comments and discussion on the ideas in this paper: Lila Gleitman, Aravind Joshi, Tony Kroch, Mitch Marcus, Michael Niv, Beatrice Santorini, Raffaella Zanuttini. This work has been partially supported by ARO grant DAAL03-89-0031 PRI and DARPA grant N00014-90-J-1863. The author has been supported by a Unisys doctoral fellowship.

2. In my presentation of Tavakolian's results, I consider only cases of relative clauses with a gap in subject position in which her data is most clear. Tavakolian's children seem to generally experience more difficulty with object relatives, and this may be the result of some other interfering factor.

3. See also the studies of Hsu et al. (1985) and McDaniel and Cairns (1990) that investigate the acquisition of control. Their results are consonant with Goodluck's finding of an asymmetry between cases of complement and adjunct control.

4. Unfortunately, the oldest group in Wexler and Chien's study had an average age of 6;03, at which point raising was not present in most of the children's grammars. Thus, the emergence of the raising construction could not be studied. Moreover, since none of these children were yet of an age at which the formation of A-chains was supposed to be possible, the relationship of this delay to that observed by Borer and Wexler (1987) for passive is unclear.

5. Of course, an analysis of clausal structure which assumes VP internal subjects will necessarily involve movement in such cases, though this may or may not be problematic for the proposal at hand depending on the A/A' status of the subject position.

6. This age estimate is gleaned from Borer and Wexler's table in their (39) and the brief remarks in their footnote 14.

7. This is admittedly an extremely rough estimate, but it is not clear that one can hope to do much better on the basis of consulting different studies by different authors using distinct experimental paradigms. Clearly, this issue can only be resolved through a longitudinal study over a wide range of constructions.

8. In fact, such coincidental emergence is not necessarily a consequence of relating multiple acquisitional difficulties to a single cause. In its weaker, though less interesting, form, the hypothesis of a single underlying factor which delays a variety of constructions merely imposes a lower limit on the age at which these contructions appear in their adult forms. Other unrelated factors could further slow a construction's appearance.

9. For work in this vein, see Kroch (1989), Kroch and Santorini (1991), Frank (1991).

10. Kroch (1989) shows that standard constraints on Wh-extraction are easily capturable within a TAG-based theory of grammar through a version of the ECP stated over the local domains of a TAG. Interestingly, Kroch also shows that the principle of Subjacency falls out as a corollary of TAG's restricted formulation of movement and thus needs not be explicitly stated as a universal grammatical principle.

11. This proposal can in some sense be seen as a radical generalization of the suggestion in Lebeaux (1988) that young children cannot utilize adjoin-α. The TAG adjoining operation is involved in a much larger set of constructions that those involving adjoin-α, which was limited to true adjunct constructions.

12. In order to ease reading, the NP nodes in these and all further examples will be filled in, presumably by subsitution.

13. Note that *prima facie* this suggestion seems at odds with the data for the cases of adjunct control. Recall that children incorrectly assume that the PRO subject of an adjunct clause can be controlled by the object NP. In

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contrast, children interpret the empty subject of a relative clause appearing after the object NP is interpreted as modifying the subject NP. We are forced to say, then, that children do not employ the same alternate analyses in these two case. Exactly how this apparent paradox is to be resolved I leave for future work.

14. In Thornton's data, there is one problematic example in which the complex Wh-element appears in the matrix specifier position and the medial position is filled with what looks like a resumptive Wh-expression, much like case of wh-extraction in Irish.

Which smurf do you think who has roller skates on? (Tiffany 4;9)

Generating this example requires the use of adjoining and hence suggests that the child who uttered it made use of this operation. Perhaps though, the computational demands in parsing and production differ and consequently, adjoining is possible at an earlier stage in production than it is in understanding.

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ESCOL '91 93-108

WHAT TO FOCUS IN SINHALA

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The Problem:

Sinhala, an SOV Indo-Aryan language of Sri Lanka, shows features that bear directly on current discussions concerning "WH-in-situ" languages. In Sinhala, there is no movement of WH to SPEC CP in S-Structure, and WH forms, which are always accompanied by the question particle *də* (Q) may remain in situ, as in (1a). Other orders are possible, as in (1 b and c), with the same reading:

1. . a Siri mokak də keruwe?
Siri what Q did
b. mokak də Siri keruwe ?
what Q Siri did
c. Siri keruwe mokak də ?
Siri did what Q
'What did Siri do?'

WH may also occur within an embedded S, giving a narrow scope (embedded question) reading, as in (2):

2. [Siri mokak də keruwe kiyəla] amma kalpənaa-keruwa.
[Siri what Q did COMP] mother thought'
'Mother thought (about) what Siri did.'

The WH form may also occur in the higher S with wide scope reading, as in (3a). Order is again variable, as in (3b and c):

3. a. Siri keruwa kiyəla] amma kalpənaa-keruwe mokak də ?
[Siri did COMP] mother thought what Q
'What did mother think that Siri did.'
b. mokak də [Siri keruwa kiyəla] amma kalpənaa-keruwe ?
What Q [Siri did COMP] mother thought
'What did mother think that Siri did.'
c. mokak də amma [Siri keruwa kiyəla] kalpənaa-keruwe ?
What Q mother [Siri did COMP] thought
'What did mother think that Siri did.'

However, the WH form may also apparently remain in situ in the lower S, still with wide scope reading, as in (4), an apparent resemblance to WH in situ languages such as Chinese, in which ambiguous scope readings are possible:

4. [Siri mokak də keruwa kiyəla] amma kalpənaa-keruwe ?
[Siri what Q did COMP][1] mother thought
'What did mother think that Siri did?.'

Sinhala may thus appear to be simultaneously a Move WH and a WH-in-situ language. However, the clue to the apparent paradox lies in the differential verb marking in the examples. In (2), an affix *-e/ē* appears on the lower verb, but in (4) it appears on the upper one. This FOCUS affix, which will henceforth be indicated as -E in glosses, marks the verb of a focused (i.e. cleft) S in Sinhala, as in (5a).[2] Again, order is variable as in (5b):

5 a. Siri keruwe waḍuwæḍə tamayi.
Siri did-E woodworking EMPH
'It was indeed woodworking that Siri did.'
b. Siri waḍuwæḍə tamayi keruwe.
Siri woodworking EMPH did-E '
'It was indeed woodworking that Siri did.'

The -E affix is specialized for this focusing function in Sinhala, and it appears only on tensed (PRES(ent) or PAST) verbs, following tense.[3] It contrasts with an affix, phonologically *-a/ ā* , that appears in the same position on finite tensed verbs in neutral (i.e., non-clefted) sentences, such as the higher sentence in (2) and the embedded ones in (3) and (4). Sinhala, in the spoken variety described here, lacks verbal agreement, and the *-a* affix, which we will henceforth refer to as the FINITE affix and gloss as -A, is is the most common one in finite independent sentences. (6) provides non-complex examples with -A:

6. a. Siri waḍuwæḍə kərənəwa.
Siri woodworking do-PRES-A
' Siri does woodworking.'
b. Siri waḍuwæḍə keruwa.
Siri woodworking do-PAST-A
' Siri did woodworking.'

The focus affix -E, on the other hand, can not occur unless some constituent not including the verb is focused, as in the earlier examples.

Clearly, an adequate account for the scope phenomena above will require a satisfactory explanation of the interaction of WH movement and focusing. Before providing one, however, we must first present some general characteristics of focused sentences in Sinhala as they relate to both WH and non-WH forms.

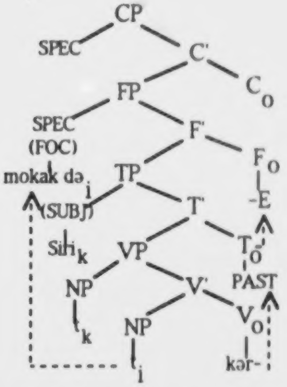
Verb Marking:

As stated earlier, the Sinhala focused sentence construction involves -E marking of the tensed verb. Three essential observations that have been made concerning that affix are summarized in (7):

7. a. -E is structure-specific, and is not a form with general nominal distributions.
b. It indicates that the focus is external to, i.e., does not include, the verb. that is, it requires a verb-external focus.
c. It is in complementary distribution with the most common finite verbal affix -A, and like it, follows tense.

Let us now, following work by Pollock (1989), Chomsky (1989) and others, assume that INFL is articulated into more than one functional projection. As stated earlier, Sinhala lacks agreement (for associated properties see Gair and Wali, 1988, Gair 1991). It is thus reasonable to assume that the position occupied by AGR in some other languages is occupied by a functional head that we may refer to as F_O, (F for "finite") having as its exemplars the affixes -A and -E. It will then project a specifier SPEC,FP. When F_O is -E, its SPEC will be the focus position under a kind of SPEC-HEAD agreement which both licences and requires movement to that position (in the non-in-situ cases). The tree for a transitive clause with a focused object, as in (1), will thus be as in (8) before WH movement to SPEC,CP. We use (lb) as an example to avoid complexities induced by variant orders. In situ cases such as (la) will be dealt with later.[4] Note that verb raising also takes place here, to associate the tensed stem with the -E affix.

8.



mokak də Siri keruwe
what Q Siri do-PAST-E
'What did Siri do?' (-lb)

The Question Particle and other "Focus Marking" Forms:

As mentioned earlier, all WH questions in Sinhala require co-occurrence of *də* with the WH form.[5] However, *də* is actually only one of a set of forms, commonly clitics or particles, that share the property that they can occur only in two positions: immediately following the verb of a neutral sentence or immediately following the focus of a focused sentence. In the latter case, their occurrence will thus require the -E affix on the verb. They have thus been referred to as "focus-marking forms". In addition to *də*, the list includes *nemeyi/newi* 'constituent/focus negator', *yi* and *tamayi* 'emphasis or limitation' and some others.[6] Since focused constituents are maximal projections, these forms always follow XPs.[7] (9) and (10) show the occurrence of *də* and *tamayi* respectively following the neutral verb. Note that with *də* this yields a yes-no question. Variant orders are again possible, though not shown.

9 Siri waḍuwæḍə kerənəwa tamayi.
Siri woodworking do-PRES-A EMPH
"It certainly is the case that Siri does woodworking.'

10. Siri waḍuwæḍə kerənəwa də?
Siri woodworking do-PAST-A Q
'Did Siri do woodworking?'

(ll)a and (b) show *tamayi* and *də* following a non-WH focused element. Note that here də yields a constituent question.[8] (12) repeats (la), and illustrates the parallel occurrence of *də* with WH. Again, variant orders are possible as well as the in situ ones shown:

11 a. Siri waḍuwæḍə tamayi kəranne.
Siri woodworking EMPH do-PRES-E
'It is certainly woodworking that Siri does'
b. Siri waḍuwæḍə də kəranne ?
Siri woodworking Q do-PRES-E
'Is it woodworking that Siri does?'

12. (=1a) Siri mokak də keruwe
Siri what Q do--PAST-E
'What did Siri do?'

As (13) and (14) show, focusing is not limited to arguments, but is applicable also to adjuncts, including sentential ones:

13 a. Siri heṭə tamayi waḍuwæḍə kərənne.
Siri tomorrow EMPH woodworking do-PRES-E
'It is tomorrow that Siri does woodworking'
b. Siri heṭə də waḍuwæḍə kərənne?
Siri tomorrow Q woodworking do-PRES-E
'Is it tomorrow that Siri does woodworking?'

14. a. pawulə gamee innəkoṭə tamayi Siri waḍuwæḍə kərənne?
village be(ANIM)-PRES-when EMPH Siri woodworking do-PRES-E
'It is when the family is in the village that Siri does woodworking?.
b . pawulə gamee innəkoṭə də Siri waḍuwæḍə kərənne?
village be(ANIM)-PRES-when Q Siri woodworking do-PRES-E
'Is it when the family is in the village that Siri does woodworking?'

Focusing of WH-

In Sinhala, the focusing of WH In root sentences is virtually obligatory. Given the restrictions on focus-marking forms, this has the result that *də* occurs immediately following the WH form and the verb is E-marked, as in all examples so far. Thus sentence (15), even though the verb is marked with the FOCUS affix, is ungrammatical, since *də* does not follow the WH- form:

15. *eekə kauru hæduwe də   that who make-PAST-E *də*

There are, however, three classes of exceptions to the focusing of WH, in which the lack of focusing can be seen in the non-adjacency of WH and Q. The first two of these exceptions pertain to "general doubt", most clearly seen in appropriate embedded contexts, and exclamations, as in as in (16) and (17):

16. a. [eekə kauru hæduwa də] danne nææ.
that who did-A Q know[9] not
'(I) don't know who could have done that.'
b. [miniha mokak kərənəwa də] danne nææ
[man what do-PRES-A] know not
'(I) don't know what (on earth) he is doing'

17. mee lamaya bat koccarə kanəwa də!
this child rice how-much eat-PRES-A Q
'How much rice this child eats!'

These two cases can be seen as related, since they are in some sense not true WH information seeking WH questions, and they are of no special relevance here.

The third set of exceptions is immediately relevant. It involves quantifier WH, such as *kiiyak* 'how many (inanimate)' *koccarə* 'how much', *kiidenek* 'how many (human)', etc. as in (18):

18. pot kiiyak gatta də?
books how many buy-PAST-A Q
'How many books did you buy?'

Thus (17) above can also be read as a true question with the appropriate intonation; i.e., 'How much does this child eat?' At present, we have no explanation for why quantifier WHs should be exceptions to the general rule, though we assume that it is a function of their semantic character.

Note, however, that quantifier WH CAN be clefted, with an appropriate sense, as in (19) and (20):

19. oyaa gatte pot kiiyak də ?
you buy-PAST-E books how-many-INDEF Q
How many books was it that you bought.'

20. mee lamaya bat koccarə də kææwe ?
this child rice how-much Q eat-PRES-E
'How much was it that the child ate?'

In the present context, it is important to note that for wide scope interpretation they MUST be focused in the higher clause just like other WH, as in (21a) and (b), again showing variant orders:

21. a. lamaya bat koccarə də kææwa amma æhuwe.
child rice how-much Q eat-PAST-A mother ask-PAST-E

b. lamaya kææwa amma æhuwe bat koccarə də
child eat-PAST-A mother ask-PAST-E rice how-much Q
'Was it how much rice the child ate that Mother asked?'

These quantifier exceptions to WH focusing are important in the present context since under standard assumptions, the forms must move in LF to receive an interpretation, even in non-embedded contexts. This shows clearly that WH questioning and focus are independent, though linked, phenomena. Other evidence for this will appear subsequently.

The obligatory co-occurrence of *də* with WH rules out the occurrence of other focus marking forms there, but otherwise WH and non WH forms have so far behaved alike with respect to their interaction with focus-marked verbs and with focus-marking forms such as *də*. Before returning to our original problem, we must look at some other important characteristics of focused sentences.

Cyclic Focusing:

It is already clear from sentences such as (3) and (4) in which the -E affix on a higher verb related to an element in an embedded clause, that Sinhala focusing is not clause bound. (22) furnishes an additional example with a non-WH form and *tamayi*. It thus illustrates that long distance focusing is not restricted to WH forms. (22a) has the form in situ, (22b) shows rightward placement in the higher clause. The null symbol Ø here and subsequent examples should be taken for now only as a device for showing the "original" position of the focused element, i.e., its unmarked position in the a variants or neutral sentences. Similarly, the superscript f's are used as a convenient presentational device to indicate the association of the focused element with the appropriate verb.

22. a. siripaalə eekə Gunəpaaləṭayi^{f} dunna kiyəla man kiwwe^{f}.
Siripala that Gunapala-DAT-EMPH give-PAST COMP I say-PAST-E
b. siripaalə eekə Ø^{f} dunna kiyəla man kiwwe^{f} gunəpaaləṭay^{f}.
Siripala that give-PAST COMP I say-PAST-E Gunapala-DAT-EMPH
'It was to Gunapala that I said that Siripala gave that.'

Note that we have here also a kind of wide-scope interpretation, but the focused element bears the case marking appropriate to the lower clause, regardless of its placement. Thus the focus, *Gunəpaaləṭə*, is dative as indirect object of *dunna* (gave). The focus thus stands in a case and Theta-role relation to the lower verb, but in focus relation to the higher.[10] To this point, all examples so far involving embedding have shown focusing of the upper clause only. We can refer to long distance focusing of this kind as "cyclic" focusing.

Narrow Scope Embeddings:

It is, not surprisingly, possible to focus within the lower clause alone. That is in fact what occurs in the narrow scope WH examples such as (2), repeated here as (23)(24) provides a non-WH example, involving embedding of (5a):

23. [Siri mokak də^{f} keruwe^{f} kiyəla] amma kalpənaa-keruwa.
[Siri what Q do-PAST-E COMP] mother think-PAST-A'
'Mother thought (about) what Siri did.'
24. Siri keruwe^{f} waḍuwæḍə tamayi^{f} kiyəla amma kiww.a
Siri do-PAST-E woodworking EMPH COMP mother say-PAST-A
'Mother said that It was indeed woodworking that Siri did.'

Iterative Focusing:

Sinhala also allows a more complex pattern, with a single element apparently focused in both higher and lower clauses. This "iterative" focusing is illustrated in (25a) and (b) with non-WH and WH forms respectively. For many if not most speakers, the complementizer *kiyəla* does not occur in these iteratively focused sentences, a point to which we will return. Again, we get wide scope readings:

25 .a. (Focused declarative)
gunəpaalə Ø^{f} gæhuwe^{f} (kiyəla) Karu kiwwe ^{F}Siripaaləṭə^{f,F} tamayi..
Gunapala hit-PAST-E (COMP) Karu say-PAST-E Siripala-DAT EMPH
?'It was Siripala that Karu said that it was he who was hit by Gunapala.'

b. (Focused question)
gunəpaalə Ø^f gæhuwef (kiyəla) Karu kiwwe^F siripaaləṭə f.F də?
Gunapala hit-PAST-E COMP Karu say-PAST-E Siripala-DAT Q
?'Was it Siripala that Karu said that it was he who was hit by Gunapala?

The verb *gahanəwa* 'hit' in (25) is subcategorized for a dative object, so that here too, the case of the higher focus is clearly determined inthe lower S.[11]

Focusing and Subjacency:

Sinhala focus is subject to subjacency, indicating that focusing involves movement. For brevity's sake, we will not elaborate here, but simply provide an example in (26) of WH plus *də* within a relative clause (see Gair 1983 for further examples). Relative clauses are always prenominal in Sinhala. (26a) illustrates rightward placement of the form; (26b) is in situ. Both are bad.[12]

26. a. *Øf horəkankərəpu minihekwə hoyannef mokak dəf
stole-REL man-INDEF-ACC seek-PRES-E what Q
b. *mokak də horəkankərəpu minihekwə hoyanne
what Q stole-REL man-INDEF-ACC seek-PRES-E
'What are (you) looking for a man who stole?'

Sinhala does not , however, exibit Subject-Object assymetry in focusing.

Weak Crossover:

One other important difference between focus and WH must be pointed out. Focused WH forms exhibit weak crossover (WCO) in relevant structures, whereas focused non-WH do not, as in (27) and (28)

27. eyaage $_i$ amma dække kaudə $*_{i/j}$?
(s)he-GEN mother see-PAST-e who Q
'Who did his/her mother see?'
28. eyaage$_i$ amma dække gunəpaalə $_{i/j}$ tamayi.
(s)he-GEN mother see-PAST-E Gunapala EMPH
'It was Gunapala that his mother saw.'

Since weak crossover is generally regarded as an LF phenomenon, this clearly suggests that there is WH movement in addition to, and thus distinct from the focusing that makes the WH element "available" for wide scope interpretation.

Restatement of the Problem:

We can now restate our original problem in terms of the observations made so far as points a-f in (29):

29. a. Focusing by the verb of the higher clause makes WH elements in the lower clause available in some way for wide scope interpretation; that is, under assumptions common in current work, for LF movement to SPEC,CP of the higher clause.

b. Overt focused forms in a lower clause, either WH or non-WH, can be in situ in S structure but still available in some way in the higher clause, as shown by both verb marking and wide scope interpretation.

c. Sinhala focus is subject to subjacency, a constraint associated with movement;.

d. WH forms exhibit WCO, non-WH do not, when focused.

e. At least some WH forms can undergo LF movement without focusing, but this applies only locally. For these forms also, focusing into a higher clause is required for a wide scope reading.

f. Sinhala allows both "cyclic" focusing (focused element in focus relation only to higher verb) and "iterative" focusing, in which the element stands in a focus relation to both higher and lower verbs.

Points (a) and (b) are the observations with which we began. (c), (d), and (e) taken together suggest not only that movement is somehow involved in focusing, but that focus and WH are distinct. Taken together with (a), they also indicate that WH movement is local, that is, movement only to the nearest SPEC,CP. (f) raises questions as to the nature of apparent focus movement.

Two tasks remain to be addressed: (1) to provide some account of apparent focus movement, and (2) to indicate how it can also leave forms in situ.

For the in situ cases, at least, an account appealing to straightforward syntactic movement of the actual focused phrase unappealing if not impossible If the form is moved to the higher clause, say by movement through SPEC,CP, how does it return? Downward scrambling is clearly not satisfactory for a number of reasons, especially where it would have to go two or even more clauses down. Other variant orders, presumably arising from scrambling, further complicate the issue. Here we can at best sketch out an approach that promises to account for the relevant data, given suitable elaboration that we can set forth elsewhere at greater length

Generally speaking, there have been two major approaches to Sinhala focus in the literature. One assumes that the focused element, or something representing it, is moved to occupy a position of some sort in the same sentence as the verb bearing the -E affix. This "monoclausal" approach was implied in (8) above. It has been the most common approach in the literature relating directly to Sinhala, as in earlier transformational analyses such as Gair (1970), Fernando (1973), and DeAbrew (1980), and in the early GB analysis in Gair (1983). It is generally consistent in a general way with such treatments of other languages as Horvath (1985) for Hungarian.

The second approach follows a line familiar from analyses of English and other languages in a general tradition stemming from Chomsky (1977). It has recently been applied to Sinhala by Sumangala (1989). It is biclausal, in that it takes focused sentences to be true clefts, in which the verb bearing the -E affix and its dependents occurs as a kind of sentential subject of the base generated predicate of a higher sentence. The clefted/focused element (with focused XP left sister to I_{0},) is in the usual rightward predicate position. It is linked to the gap in the sentential subject by standing in a predicative relation with a null operator within the sentential subject that binds the gap within it.[13]

One important difference between these approaches is that the first allows intersentential movement of the form itself, as a possibility for the non-in-situ cases while the latter relies on base generation of the form and a chain headed by a null operator. As a matter of fact, we now find a combination of both analyses to be necessary to account for different but interlocking sets of phenomena connected with Sinhala focus and WH. Here, however, we will, for brevity and simplicity of presentation, present a partial account utilizing first, the "monoclausal" approach, and then sketching out its extension so as to incorporate the biclausal one.

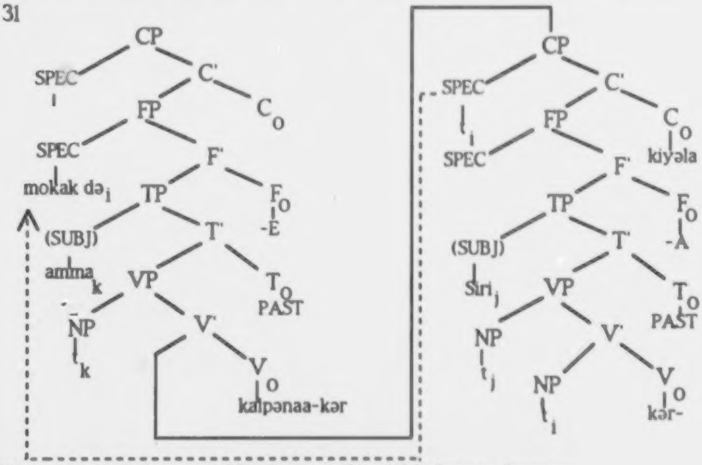
Setting aside in situ cases for the present, local focus and WH can be simply accounted for in terms of the projection of -E in F_O given earlier. The form in SPEC,FP in earlier (8) is simply extended by WH movement in LF as in (30) Focused non-WH forms not undergoing WH movement simply remain in SPEC,FP.

30. $_{CP}$[mokak də$_i$ $_{C'}$[$_{FP}$[t$_i$ $_{F'}$[....t$_i$...]]]]

Local focusing within only the lower clause, as in (2) gives a narrow scope reading, is simple. The focused CP is embedded as complement to the higher verb. That verb has -A, but the lower one has -E, so that movement is to the lower SPEC,FP, as required by SPEC-head agreement.. It remains there, since further movement is not licensed by a higher -E in F_O.

Long distance cyclic focusing, where only the top verb is -E marked, is as in (31), using (3c), repeated as (32). (We will not attempt to account for the variant orders here). The solid line represents dominance, and the dashed line movement.

31

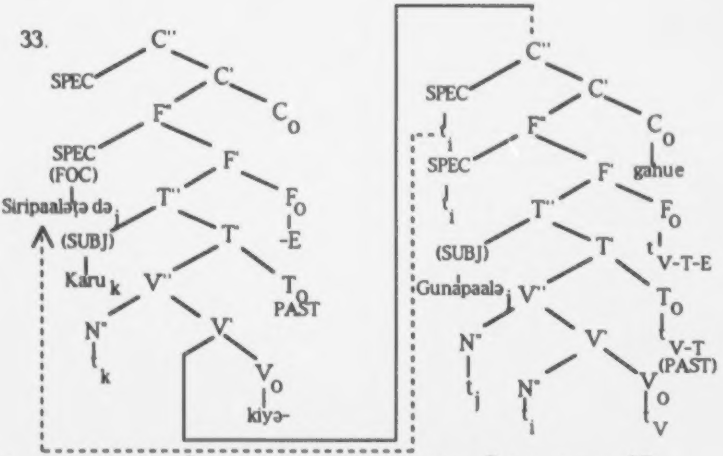


32. mokak də amma [Siri keruwa kiyəla] kalpənaa-keruwe.
What Q mother [Siri did COMP] thought
'What did mother think that Siri did.'

The lower clause element to be focused, in this case he object, moves up cyclically to the highest SPEC,FP in the standard way, and such movement is in fact required by the presence of the -E affix heading that SPEC. We assume that -A does not enforce SPEC-HEAD agreement, or, alternatively, the lower subject could move to SPEC,FP with no visible effect. WH movement to the highest SPEC,CP is again local.

Iterative focus is also largely straightforward. The tree is as in (33), with (25b), repeated as (34) as example. We do not provide an account for the order difference between tree and example here. [14] Note that the major difference from (31) is that The -E affix occurs as Fo in both lower and higher S's. in (33).

33.



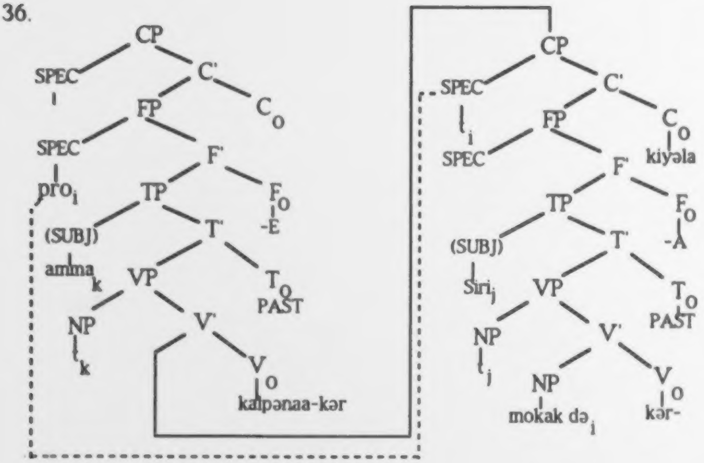
34. gunəpaalə Ø^{f} gæhuwe^{f} (kiyəla) karu kiwwe^{F} siripaaləṭə də ^{f,F}?
Gunapala hit-PAST-E (COMP) Karu say-PAST-E Siripala-DAT Q
?'Was it Siripala that Karu said that it was he who was hit by Gunapala?'

Movement of, say, a focus-marked lower clause object to the lower SPEC,FP is then required by the -E affix on that head. It moves from there, cyclically through SPEC,CP, to the higher SPEC,FP. Note that in this example we have also assumed movement of the verb+TENSE+E complex to C$_0$. This is motivated in part by the fact mentioned earlier that the complementizer *kiyəla* does not freely occur in iteratively focused S's. The empty C$_0$ thus allows this movement of V-T-E , which in turn facilitates the movement of the form, already focused through SPEC-head agreement withlower F$_0$, through SPEC,CP, again by SPEC-HEAD agreement..

We are still left with the other half of our problem, however; i.e., if the element does remain in situ, what moves up to occupy the higher SPEC,F'' position? Here we turn for a solution to a proposal made by Harbert and Toribio (1991) in a different context. They argue in relation to accounting for nominative case objects in dative subject sentences, as well as some other phenomena, that it is possible to co-index a phonologically represented form with a higher pro element that is essentially a C-commanding expletive. This is an attractive possibility in the present case, and in fact we are forced to such a conclusion in order to account for what amounts to invisible movement in the in situ cases, given the impossibility of downward movement scrambling solutions. Under these assumptions, the tree for a sentence like (35) (= 4, but without left extraposition of complement S) would be as in (36). Here the dashed line represents the co-indexing, rather than movement proper

35. amma [Siri mokak də keruwa kiyəla] kalpənaa-keruwe?
mother [Siri what Q do-PAST-A COMP] think-PAST-E
'What did mother think that Siri did?'

36.



Note that this is essentially he same as (32) except for the reversed chain. The requirement of SPEC-HEAD agreement for F" is met by the pro in SPEC,FP which is licensed by the -E affix in FOC$_0$.The wh form can move up in LF by a kind of expletive replacement, and then move on to the highest SPEC,CP.

This solution can also be extended easily to the iterative focus cases like (33-4).

Clefting and Rightward Placement of Focus:

In the tree in (8) and others so far, the focused element is leftward in SPEC,FP. However, virtually all treatments of Sinhala in the literature have assumed that the unmarked position for cleft/focus is rightward (see the sources cited earlier, and Gair 1983 for reasons for that assumption). Now if we look at the actual cases of rightward placement, we find that they commonly differ in some respects from other positions. It appears to be the unmarked position for contrastive focus and it does in fact appear to be the case that there is a possible semantic difference, in which rightwsrd focused sentences may have a stronger presuppositional force than the others.(for some interesting data and observations on discourse correlate of focus placement, see Herring and Paolillo 1991). Occurrence of a focused element without an overt focus marking form is also more frequent rightwards than in other positions. Even more striking is the fact that only one WH item can occur to the right, though multiple WH is possible if all of them are leftward, as in (37):[15]

37 kau də mokak də keruwe ?
who Q what Q do-PAST-E
'Who did what?'

In (38), a multiple WH reading ' Who did what?' is not possible but there is a perfectly possible reading "Who did something'.

38 mokak də keruwe kau də?
what Q do-PAST-E who Q

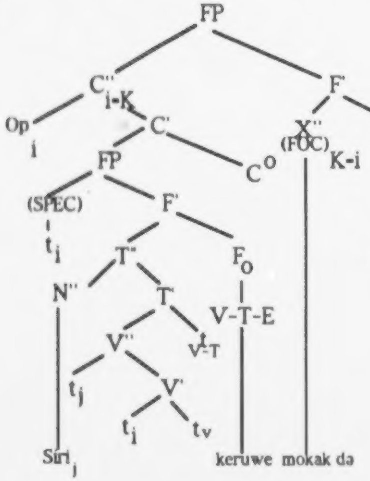
This is connected with the fact that Sinhala WH plus *də*, unfocused, can serve as an indefinite quantifier:' someone, something' etc., as in (39).

39 mokak də wætuna.
what Q fell-A
'Something (unidentified) fell.'

We will not offer a fuller account of multiple WH here, but simply note the difference with placement. We should also note that scrambling complicates the picture further, but when a focused form does appear rightwards, it generally has the characteristics noted (always, in the case of WH)

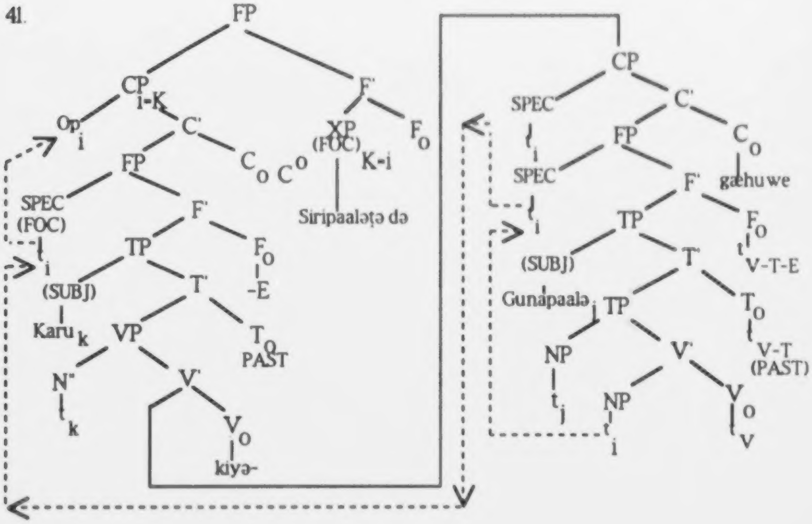
These differences may be accounted for by assuming that, in addition to the focus affix and its SPEC, Sinhala does have a true cleft construction. Following a general line of approach in Sumangala 1989 referred to above, we take this to be a kind of biclausal structure, with the rightward focused element base generated in predicate position as sister to F_o ($-l_o$),and with the clause with the -E marked content verb serving as as sentential subject. The focused item is then linked through predication with an empty operator in SPEC,CP of the subject clause (which projects its index to CP). Spoken Sinhala has no overt copula or agreement element in these or in NP equational sentences, and we take the focused element to be complement of F_o. Not unnaturally, only focused elements can be clefted, so that the operator headed chain will include lower SPEC,FP, which also accounts for the obligatory -E marking in clefts. The tree for (lc), under a cleft interpretation will thus be as in (40) (next page). This opens up the further possibility that a focused sentence could be embedded as complement to VP in a cleft sentence, We would propose, in fact, that such a derivation is possible for a sentence such as (25b - 34), with a single rightward focus, so that there would be an an alternate derivation for it with the two clauses linked by an operator headed chain.as in (41) (next page). Also, in embedded cyclic structures, rightward focus appears to be impossible in the embedded clauses, so that "true" clefting is limited to the highest one, We will leave these matters for extended treatment elsewhere (as in Sumangala, in prep.).

40


FP
C''
i-K
F'
Op
i
C'
X''
(FOC)
K-i
F
o
FP
C
o
(SPEC)
F'
t
i
T''
F
o
N''
T'
V-T-E
V''
t
V-T
t
j
V'
t
i
tv
Siri
j
keruwe mokak də

Siri keruwe mokak də
Siri did what Q'
'What did Siri do?' (-1c)

41.


FP
CP
i-K
F'
Op
i
C'
XP
(FOC)
K-i
F
o
FP
C
o
C
o
Siripaalətə də
SPEC
(FOC)
F'
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(SUBJ)
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CP
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V-T-E
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Gunapaalə
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V-T
(PAST)
NP
t
j
V'
NP
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o
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v

A Final Note:

There has been a considerable amount of discussion in the recent literature concerning the applicability of subjacency in LF and pied piping as a way to escape subjacency violations under the view that subjacency applies in LF as well as in syntax. Thus it has been suggested for Japanese and Korean by

Nishigauchi(1990) and Choe (1987) that subjacency holds at LF, contra Huang 1982 (and subsequently), Lasnik and Saito (1984) and others. That view entails that entire phrases which are bounding domains containing WH are pied-piped in LF and then interpreted.[16] This argument has recently been extended to Sinhala (Kishimoto 1991). Our discussion here has not provided direct evidence one way or the other on these issues, and we can not address them fully here. We can note, however, that as far as we are aware, the same scope facts pertain to the presumably pied piped constituents as to the ones we have dealt with here. Any such discussion must thus ake note of the distinction between focus movement and WH movement that we have observed, as well as the dependency of the latteron the former. Clearly also the behavior of WH and non-WH elements in relation to focusing must be reconciled.

FOOTNOTES

[*] We are grateful to John Bowers, Vicki Carstens, Wayne Harbert, Barbara Lust, and the participants in the Cornell Tuesday Linguistics Colloquium for valuable discussion and comments. Special thanks are due to Jacqueline Toribio for extra commentarial and editorial efforts. Mistakes are, of course, our own.

[1] The complementizer here is *kiyəla* 'that (quotative)',rightwards in accordance with the general left-branching nature of the language

[2] These have been variously referred to in the literature as 'focused', 'cleft', 'pseudo-cleft' or 'emphatic' sentences. In this paper we will refer to them either as 'focused' or 'cleft' sentences, depending on context. 'Focus' here is used to refer to the relevant item in such sentences, not in its more general, pragmatically linked, sense.

[3] It differs in respect to this specialization from the form appearing in clefted sentences in Tamil and Malayalam, which bear a number of resemblances to those in Sinhala. The Tamil and Malayalam forms, *-(a)tu* and *(a)tə*, have a clearly (pro)nominal character with phi features (3sg, neuter), and appear in sentence nominalizations. In older Sinhala, however, this was also the case. See Gair (1980),.

[4] As in Gair (1990), Sumangala (1991) and much current work, we assume that the subject is initially generated within VP.

[5] WH forms include: *mokak* 'what' (sg. indef.), *monəwa* 'what (pl.)', *kauru* 'who, *kookə* 'which', *koyi* 'which (Det.)', *koccərə* 'how much' and *kiiyə* 'how many'.

[6] Others include *mayi* 'emphasis, certainly,' *lu* 'reportative', *nan* 'if', *nee* 'n'est ce pas', and *wennə æti* 'might be'. See Gair (1970, 1983). and Gair and Paolillo (1988).

[7] Since these forms may follow the verb of a neutral sentence we assume here that VPs have inherent focus; i.e. they are focused unless some other form not including the verb is focused. Items may be focused and still trigger -E without being marked by one of these forms, particularly when they are rightwards. Thus (5a) is fully grammatical without *tamayi*. We will return to this later.

[8] This contrasts with languages like Tamil, in which constituents can be questioned without triggering the focused or nominal form of the verb, as in *cuntaramaa neettu cennekki poonaaru* 'Sundaram-Q yesterday Madras-DAT go-PAST-3sg(Hon) - It was Sundaram who went to Madras yesterday' (Asher 1982, p.98).

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[9] The *-e* on the verb here is also -E, which obligatorily occurs with *nææ* 'not'. This appears to be a separate special use of the affix, and we do not consider whether a focused structure is involved here.

[10] Focus is unbounded to greater depths, as seen in following sentence, which shows focusing to three clauses below the highest:

[[[[Øf ee baḍu horəkankəlaa kiyəla] Siripaalə kiwwa kiyəla] Sunil dannəwa
that goods stole-A COMP Siripala said-A COMP Sunil know-PRES-A
kiyəla] oyaa kiwwef Gunəpaaləf də]
COMP you said-E Gunapala Q
'Was it Gunapala who you said that Sunil knows that Siripala said stole the goods?'

[11] The sentence 25 is actually ambiguous. *Siripaaləṭə* could be indirect object of *kiwwe* with the Ø giving arbitrary reference, and with the reading, "Karu told Siripala that Gunapala hit someone,' but this reading is irrelevant here.

[12] Such examples can be rescued by focusing and questioning the entire NP containing the relative: [*mokak horəkankərəpu minihekwə də] hoyanne* - what stole-REL man-INDEF-ACC Q seek-PRES-E. 'What are (you) looking for a man who stole?' Note that here the Q is separated from WH. We set aside the question of the interpretation of such forms here.

[13] A similar similar analysis proposed by Madhavan (1987) for Malayalam, which resembles Sinhala in many but not all relevant respects,

[14] The situation is complicated by the very common left extraposition of complement clauses, and by the rightward placement of the focused constituent, which, as we will claim subsequently, allows for an alternate derivation. There are, however, clear cases of iterative focusing both with the expected order and in situ.

[15] This has also been noticed, independently, by Kishimoto (1991), who has, however a different account.

[16] See also the response by Fiengo et al (1988).

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ESCOL '91 109-120

SYNTACTIC CONSTRAINTS ON TEMPORAL REPRESENTATIONS: Evidence from Italian and Latin*

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IRST, Trento, Italy

In this work we analyze the problem of the mapping between semantics and syntax in the domain of tense. We adopt a revised version of Reichenbach's (1947) hypothesis on tense representation and the results of recent theories on the syntax of verbs (see Chomsky, 1989; Pollock, 1989; Belletti 1990; Roberts, 1991). In particular, we study the distribution of auxiliary verbs and propose a theoretical account that predicts their presence. We consider the Italian and the (classical) Latin tense systems, because, in spite of their similarities, they exhibit some striking differences exactly in the domain we are interested in.

We argue that auxiliaries, which project their own VPs, are required for purely syntactic, not semantic, reasons and that correct empirical predictions follow from the interaction between universal principles and language-specific characteristics.

In this paper we limit our discussion to main sentence phenomena; moreover, we consider only tense questions, leaving aside the problems related to aspectuality.

1. Syntactic Constraints

The Reichenbachian model has been adopted and revised by several linguists (among others: Comrie, 1976; 1985; Hornstein, 1990; Scorretti, 1991). Comrie (1985) and Hornstein (1990) have proposed that the relation among the three points must be split into two distinct relations, the first between R and S, and the second between E and R; this entails that a direct relationship between E and S is never realized but must always be mediated by means of R.

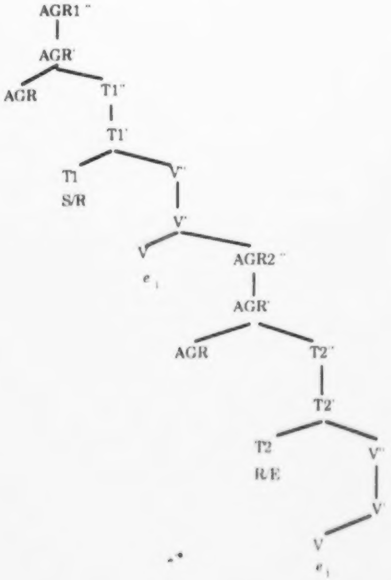
In this work it is assumed that *tense morphemes* instantiate the relations between S and R and between R and E; we use the labels T1 and T2 to refer to them. T1 and T2 are syntactically realized at D-structure therefore projecting TP1 and TP2 respectively; their occurrence is ruled by the following principle:

(1) Biunique Mapping Principle (BMP): [1]
Temporal morphemes and T-relations are in biunique correspondence

this principle implies that, given a certain T-relation, for instance S_R (S precedes R) there is one and only one morpheme corresponding to it and that, viceversa, once we find a morpheme, for instance Italian *-er-* in *mang-er-o'* (lit: eat+fut+first pers sing), there is one and only one T-relation corresponding to it. One consequence of this principle is the impossibility of hypothesizing T1 or T2 in the tree if there is no morpheme in the string. To be more precise: our idea is that T1 or T2 cannot appear in the tree if (phonologically non-null) morphemes are *never* realized in correspondence to a certain semantic value in a given language.

Summarizing, T1 and T2 with their projections lexicalize tense relations, i.e. S/R and E/R respectively. The structure we are going to propose for Italian is the following:

(2)



This structure is instantiated in constructions like *ebbi mangiato* (I had eaten) and is, in some sense, the "maximal" configuration which can possibly be realized. It closely resembles the structure proposed by Belletti (1990), with the only difference that she labels the past participle morphology Aspect, whereas, in our approach it is considered a temporal projection, i.e. T2.[2] The lower VP is projected by the verb, whereas the higher one is projected by the auxiliary, in Italian either *essere* (be) or *avere* (have). Auxiliaries are verbs whose *event* specification is inherited by that of the main verb. Let us stress that according to the view outlined here auxiliaries don't give any contribution *per se* to the temporal interpretation of the sentence, but must be realized only for syntactic reasons, therefore their presence is not ruled by BMP. Moreover, we have nothing original to propose here on the *choice* of auxiliary; we simply refer the reader to Gueron and Hoekstra, 1988 and references cited there. AGR1 represents the set of ϕ-features, in Italian *person* and *number*, which are shared with the subject; we will say that it is a verbal agreement. AGR2 (Chomsky's, 1989 Agreement-object) is specified for *gender* and *number* and therefore we will consider it as a nominal/adjectival agreement.

According to the discussion in Li (1990), the heads which neither *assign*, nor *receive* a θ-role are defined as functional. In our perspective, it will be sufficient to claim that categories not *assigning* θ-roles are functional. Therefore both AGR1 and AGR2 are functional. Conversely, we will say that T1 and T2 are lexical categories since they assign a *T-role* (for a proposal in this direction, though with different empirical and theoretical consequences, see Gueron and Hoekstra, 1988; Zagóna 1988). T-roles are assigned under government to *event-points*. A T-criterion is also established:

(3) T criterion: every T-role must be uniquely assigned to an *event-point*

That is, a VP-event cannot bear more than one T-role and every T-role must be assigned to an *event*.[3] A T-role, therefore, analogously to a θ-role, is the formal device which permits the identification of the e-point carried by the verb, or more generally by the predicate, with the semantic value assigned to it by T, i.e. a specific temporal interpretation. Developing an idea suggested by Li (1990), we hypothesize that functional categories "block" incorporation; in other terms, following Rizzi and Roberts (1989) and Roberts (1991), in Italian and Latin, there is an affixation process operating on X^{-1} categories by substitution in the subcategorized slot. Such a process stops when a functional category, for instance AGR, is met; i.e. in Italian and Latin AGR can never appear in the subcategorized slot, defining therefore word boundaries. Notice that in these languages word boundaries of major lexical categories, V, N and A, are *always* defined by an AGR node, either nominal/adjectival or verbal. Presumably this characteristic is parametrized, in that other languages seem to be different, see for instance the analysis of Berber given by Ouhalla (1990), where Tense appears higher than Agreement. Finally, adjunction processes and substitution in a Ø-head can go beyond a functional category, so that a verb can further move to C if required.

Observe also that T2 in Italian requires an AGR2 and is not compatible with AGR1. We claim that this is due to the fact that T2 is adjectival and therefore incompatible with the feature person, typical of verbal categories. Technically, we will say that T2 is a [+V; +N] category and that these features percolate up together with the stem which climbs the tree; AGR2 with gender and number features is [+V; +N] and the compatibility requirement is met. If, on the contrary, an AGR1 were present, the final result would lead to an unacceptable situation: AGR1, in fact, being specified for person is characterized by the features [+V; -N] and is therefore incompatible with an adjectival form. It is not the case however, that in every language T2 is always specified in this way. For instance we will see below that in Latin the (active) T2 morpheme expressing E_R must be considered a verbal projection and, as predicted, is compatible with AGR1.

Summarizing: in Italian every sentence containing a T2 has an AGR2; since AGR2 is a functional category, it blocks incorporation. Given that, however, further information is present in the tree, i.e. T1 (at least in some cases) and AGR1 (in all cases), a head has to be provided, otherwise the bound morphemes expressing the lexical information of AGR1 and T1 could not surface. We will see that in Latin, in which T2 (expressing E_R in the active sentences) is not adjectival and is characterized by the verbal features [+V; -N], AGR2 must not appear, because the verbal AGR1 (which is also [+V; -N]) is compatible with it.

Notice finally that in a structure such as the one proposed in (2) for Italian, two factors determine the realization of an auxiliary: a) the presence of AGR2 blocking incorporation; b) the T-criterion.[4] In fact, both T2 and T1 are lexically realized and must assign a T-role to satisfy the T-criterion; T2 discharges it on the "real" verb, therefore T1 needs an auxiliary to satisfy the requirement. We will see how these two requirements set apart in Latin, providing empirical evidence in favor of our hypothesis.

2. Evidence from Italian and Latin

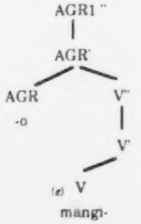
Let us briefly discuss the present tense: Italian and Latin do not use any morpheme when expressing present tense. The semantics of this tense, as Reichenbach originally suggested, is S,R,E, i.e. the three points coincide and are related by a comma; compositionally, according to Comrie and Hornstein, it can be represented as (S,R)•(R,E). In all the cases in which the relation can be represented with a comma there is no morpheme lexicalizing it. Latin, Italian, and we would like to claim language in general, lexicalize by means of morphemes only the relations in which the two points are intended to be different. Therefore, according to the Biunique Mapping Principle, no T-node can appear in the tree.

Notice that in languages having "nominal sentences", i.e.

where it is possible (or obligatory) to dispense with the copula, such as for instance Latin or Russian, the interpretation given to such predicative constructions is always *present*. As soon as the sentence expresses a different tense, i.e. past or future, a copula must be inserted. The intuitive idea our theory captures is that for the present tense interpretation no tense morpheme must surface and the copula is accordingly not necessary; the contrary is true for the past or future tense: T1 must be lexicalized and the support of an auxiliary verb is required.

The most restrictive interpretation of the Biunique Mapping Principle forces us to say that *there are no Ø lexical heads*, i.e. no Ø T1 or T2.[5] According to these considerations, the representation of a verbal form such as *mangio* (I eat) is the following:

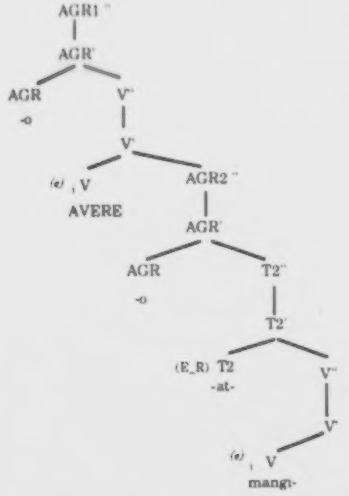
(4) Mangio
I eat



The verbal stem plus the agreement marker for person and number (AGR1) are realized in the tree. The verb incorporates the agreement morpheme at S-structure and the whole structure constitutes the input to LF interpretative rules.[6] Latin has basically the same structure, with the only difference that we are assuming that it is an OV language (see Marouzeau, 1953), or, more generally, a head-final language, therefore the AGR node appears on the other side of the tree.

Let us consider now present perfect (for an analysis along the same lines, see Scorretti, 1991).[7]

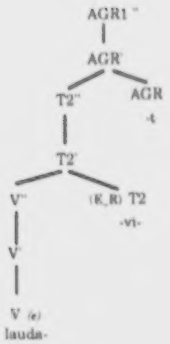
(5) Ho mangiato
I have eaten



Here, the verb is dominated by T2, i.e. by the head expressing the relation between E and R; T2 assigns its T-role to V, and being adjectival, requires an AGR2. Therefore, an auxiliary must be inserted, to lexicalize AGR1.

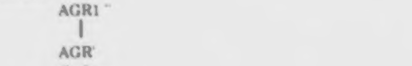
Consider now the Latin form *laudavit* (he has praised).[8] We can recognize the following components: *lauda-*, which is the verbal stem, *-vi-*, expressing the temporal value of the form, and finally *-t* lexicalizing the features third person singular. In our paradigm we say that the morpheme *-vi-* realizes the information of T2, in this case E_R, and *-t* lexicalizes AGR1. In Italian the presence of AGR2 is required by the adjectival nature of T2. T2 is verbal in Latin, therefore AGR1 is perfectly compatible with it and consequently the Latin perfect form does not require the presence of an auxiliary:[9]

(6) Laudavit
He has praised


AGR1''
AGR'
T2''
AGR
-t
T2'
V''
(E_R) T2
-vi-
V'
V (e)
lauda-

In the next example we will analyze the cases where both T1 and T2 are realized, i.e. future perfect or past perfect:

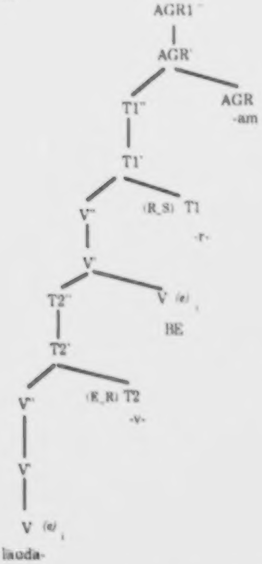
(7) Ebbi mangiato
I had eaten


AGR1''
AGR'
AGR
T1''
T1'
(R_S) T1
V''
V'
(e)i V
AVERE
AGR2''
AGR'
AGR
-o
T2''
T2'
(E_R) T2
-at-
V''
V'
(e)i V
mangi-

In this example T1 must assign its T-role and therefore requires an auxiliary verb. As we already pointed out above, in these cases the auxiliary is required in Italian both by the presence of AGR2 and by the presence of T1; however, the two requirements are independent, therefore we expect them to be split in other languages and, as we are going to see, Latin provides for such a case.

Consider the past and future perfect in Latin: *laudaveram* and *laudavero* respectively. According to our hypotheses, we are analyzing the form *laudaveram* in the following way: *lauda- v- er- am*. The semantics corresponding to this form is: T1 = R_S and T2 = E_R. We hypothesize that the form *eram* is an incorporated auxiliary, i.e. the past form of the verb *sum, esse* (be). See Lindsey (1984) for an hypothesis in this direction:[10]

(8) Laudaveram
I had praised



-vi- is a verbal morpheme, therefore, being compatible with AGR1, does not require AGR2. T1 appears in the tree (R_S for the past; S_R for the future) and, according to the T-criterion, it needs a verb to discharge its T-role therefore an auxiliary must be realized. As a further consequence of the absence of AGR2, the auxiliary can be incorporated, since no functional category intervenes (the only functional category being AGR1).

The last point to be considered concerns the Latin forms with the future participle in *-turus*; we propose that this participle lexicalizes R_E.[11] Notice that in Italian there is no (morphemic) equivalent of it. The participle *-tur-us* is clearly adjectival and therefore requires AGR2.[12] Moreover, because of the presence of AGR2, incorporation processes will not be able to include the AGR1 morpheme, or the one corresponding to T1; consequently an auxiliary has to be inserted. The resulting forms are the following: *laudaturus sum* (I am going to praise), i.e. V+T2+AGR2 AuxV+AGR1, corresponding to the semantics: R_E R,S; *laudaturus eram* (I was going to praise), i.e. V+T2+AGR2 AuxV+T1+AGR1, corresponding to the semantics R_E R_S, *laudaturus ero* (I will be going to praise), i.e. V+T2+AGR2 AuxV+T1+AGR1, in correspondence to the semantics R_E S_R.

Concluding Remarks

We have shown that current theories on the syntax of verbs and incorporation phenomena, in interaction with the BMP and simple considerations on the categorial status of T2 morphemes, can account for a wide range of empirical observations. Theoretically, our proposal also constitutes a step forward the comprehension of the intricate relations between syntax and semantics in the domain of tense.

FOOTNOTES

[*] The two authors have elaborated every part of this research together. However, as far as legal requirements are concerned, A.Giorgi takes responsibility for section 2 and F.Pianesi for section 1. This work has benefited from comments and suggestions by G.Cinque, K.Hale, M.Halle, A.Marantz, J.Gueron, C.Dobrovie-Sorin, D.Pesetsky, N.Hornstein, M.Kenstowicz, J.Higginbotham, I.Heim, K.Wexler, J.Grimshaw, L.Burzio, D.Delfitto. We thank them heartily. The usual disclaimers apply. A previous version of this work has been presented at Going Romance, Utrecht, June 1991.

[1] Hornstein (1990, p.113) proposes the following principle:

(i) Morphemes unambiguously determine unique mappings.

This principle holds only in one direction, i.e. from morphemes to tenses. In Hornstein's system nothing seems to prevent the possibility that more than one morpheme realizes the same temporal representation.

[2] See the discussion in Comrie (1976) concerning the distinction

perfect/non-perfect, which he claims is a temporal one, vs. perfectivity/ non-perfectivity which has as an aspectual nature; it is often the case that languages make the two dichotomies coincide, but it is not always so.

[3] The reverse property seems to be too strong, at least in our framework. In fact it does not seem to be true that every *event* must receive a T-role, at least not directly from T. We will illustrate below several cases in which T is not present in the tree. Notice also that the position *e* of an auxiliary is coindexed with the position *e* of the main verb. Consequently there is only one *event* from the referential point of view, but two *event* positions syntactically present. Analogously to θ-roles, the T-roles must be assigned to syntactic positions and not to referential items: in *John loves himself*, in fact, there are two positions, each independently θ-marked, but only one referential entity.

[4] These requirements are subject to parametric variations. See Ouhalla (1988; 1990), Iatridou (1990) and Rivero (1990) for interesting suggestions in various directions. Another possible parametrization presumably concerns the categorial inventory available in the various languages.

[5] On the other hand, there might be Ø AGR, since this category is functional, as opposed to lexical. Intuitively, we can suppose that functional heads are independently required by the principles of grammar and therefore must always be represented in the tree. Lexical categories, on the contrary, must be inserted only if there is a semantic content to express; in principle, such semantic content should be incompatible with Ø heads.

[6] Recall that given the BMP a given structure is never ambiguous from the point of view of its temporal interpretation at LF.

[7] It is well-known that in Italian (and French) the present perfect behaves differently from English. The simplest proposal compatible with our approach amounts to assuming that such languages are alike with respect to the syntactic representation, in that they present almost identical morphological patterns. Independent factors, which could be additional semantic or syntactic constraints, intervene in defining the possible usages of this form. See, among others, Hornstein (1990, p.216); Gueron and Hoekstra (1988, fn.8). In English the following sentence is ungrammatical:

(i) *John has left at four

whereas it is perfectly acceptable in Italian and French:

(ii) Gianni è partito alle quattro
(lit: Gianni has left at four)

The anomalous case seems to be English, since the tense structure of present perfect and the adverbial *at four* can be coherently represented in a Reichebachian framework (the graphical notation is

due to Hornstein, 1990):
(iii) E_R,S
|
at four

Notice also that the English *past perfect* is identical both in form and interpretation to the French and the Italian ones. We are therefore led to conclude that *present* has peculiar properties in English; this fact might be related to the impossibility of using present tense with progressive meaning, an option available in Italian and French. We will however not pursue the question here and leave it open for further investigation.

[8] In the grammars the *perfectum* is also glossed as a simple past, however in Ernout (1953, p.186) the latter is considered as a "secondary interpretation". We will ignore the double value of perfect, given that it seems to us to be more related to aspectual characteristics than to pure temporal representations. For a discussion of the semantic value of Latin tenses see Palmer (ed. it. 1977); Väänänen (Italian edition, 1982); Ernout and Thomas (1989); Leuman, Hofman, Szantyr (1977). For a detailed morphological analysis, see Ernout (1953), Safarewicz (1969), Lindsay (German edition, 1984).

[9] Notice that verbs partition into several classes with respect to perfect. From the morphophonological point of view, T2 in Latin might have several different realizations, according to the type of verb in question. The form *-vi-* is probably the most common (cf. Palmer 1977, p.333; Ernout , 1953, pp. 204 ff.).

[10] Etymologically, the morpheme *-er-* is often traced back to ie.**-is-*, whereas, according to our hypothesis, the original morpheme is the verb *be*, ie. **es*; this question deserves further study before something definitive could be said.

[11] Notice that the two temporal structures: S,R_E and S_R,E both convey the idea of future, since ultimately, the relationship between S and E is in both cases precedence.

[12] The ending *-us* varies according to the case, gender and number of the item it refers to, as a typical adjectival suffix.

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ESCOL '91 121-129

TOWARDS A DISCOURSE LEVEL ACCOUNT OF VP ELLIPSIS

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1 Introduction

It is widely accepted that the fundamental constraint governing VP ellipsis is based on a notion of sameness of predication. For example, Sag (1976) and Williams (1977) define a syntactic identity condition on LF representations of VP's. In this paper, I will argue that no such syntactic identity condition is compatible with the facts of VP ellipsis. I will suggest an alternative condition, which I call "identity of file-change potential" (the term "file-change potential" is introduced by Heim (1981). On this approach, VP's are treated as relations on input and output discourse models. An important consequence of this is that any contextually-determined elements within the antecedent VP, such as referential pronouns, will be evaluated independently in the antecedent and in the target[1] . This prediction differs sharply from alternative accounts, and I will give evidence that it is correct.

In what follows, I begin with some general evidence that VP ellipsis is to be explained at the discourse level, rather than at a syntactic level. Next, I describe the identity of Logical Form theory and related approaches. I then describe a discourse level alternative. I argue that this approach is clearly superior to alternative approaches, based on examples in which the target context differs significantly from the antecedent context. Finally, I examine cases where antecedent and target contexts are similar, which seem do accord with an LF identity condition. I argue that the facts concerning these cases can be explained by general conditions governing pronoun resolution, without appealing to a LF identity condition.

2 Evidence for a Discourse Level Approach

There is a variety of evidence that indicates that no syntactic or logical form theory can account for the facts of VP ellipsis. First, there are deictic cases of VP ellipsis, as mentioned in Chao (1987) and Schacter (1977). For example, if two people are considering jumping into a cold stream, one might say:

(1) I will if you do.

Thus, it is not necessary for the antecedent to be linguistically present. If the antecedent is linguistically present, it is not required to be a syntactic VP, as shown by this naturally-occurring example (p.c., Bonnie Webber):

(2) I should suggest to her that she officially appoint us as a committee and invite faculty **participation/input**. They won't, of course...

Third, there are cases in which the antecedent has not been specifically mentioned, but is inferrable based on the context, as described by Webber (1978):

(3) Martha and Irv wanted to dance together, but Martha couldn't, because her husband was there.

Fourth, there are cases in which the reconstructed material is some combination of previously mentioned predicates:

(4) After the symmetry between left-handed particles and right-handed antiparticles was broken by the kaons in the 1960s, a new symmetry was introduced which everybody swears is unbreakable. This is between left-handed particles **moving forwards in time**, and right-handed antiparticles **moving backwards in time** (none do, in any practical sense, but that does not worry theorists too much).

(From *The Economist*, 4 August 1990, p.69., Bonnie Webber, p.c.)

Finally, there appears to be no upper bound on the distance separating antecedent from elliptical VP. In a survey of VP ellipsis in the Brown Corpus described in Hardt (1990), I found that there was at least one complete sentence of intervening material about 5% of the time. One example is the following:

(5) I disagree with the writer who says funeral services **should be government-controlled**. The funeral for my husband was just what I wanted and I paid a fair price, far less than I had expected to pay. But the hospitals and doctors should be.

None of these facts is surprising from the point of view of a discourse model approach, and indeed similar phenomena are observed with pronominal anaphora. But they present fundamental problems for any approach that attempts to impose a syntactic or logical form identity condition on VP ellipsis.

3 The Identity of Logical Form Theory

An influential account of VP ellipsis is the "Identity of Logical Form" theory, which was proposed independently by Sag (1976) and Williams (1977). In this account VP's are represented as lambda expressions, with the subject lambda-abstracted, and other referential terms receiving indices. The target must be equivalent, up to renaming of bound variables, to the antecedent VP. This is termed the "alphabetic variance" condition. The application of this condition can be illustrated by examples (6) and (7).

(6) John$_i$ saw him$_j$. Bill$_k$ did too.

(7) John$_i$ thinks he$_i$ is smart. Bill$_j$ does too.

In (6), only one reading seems to be possible for the elliptical VP, i.e., Bill and John must have seen the same person. In (7), there seem to be two readings; Bill might think either John or Bill is smart. This reading is termed the "sloppy" reading, because the referent of the pronoun changes. The predictions of the alphabetic variance condition concerning referential pronouns can be summarized as follows:

1. If a pronoun is coreferential with the subject in the antecedent, it can retain the same referent in the target, or its referent can switch to the new subject.
2. Pronouns that do not corefer with the subject in the antecedent cannot switch reference in the target.

These predictions follow from the alphabetic variance condition imposed on LF representations in the Sag/Williams approach.

An appealing feature of this approach is that it explains the possibility of sloppy readings in terms of an independently motivated distinction: that of bound vs. free pronouns. That is, bound pronouns give rise to sloppy readings, and free pronouns give rise to strict readings. (This correlation is argued for at length by Reinhart (1983).)

However, the following example, due to Dahl (1972) would appear to refute this hypothesis[2] :

(8) a. John$_i$ thinks he$_i$'s a fool.

b. Bill$_j$ does too, [think he$_j$'s a fool] although

c. his wife$_k$ doesn't [think he$_j$'s a fool].

The reading of interest is that in which John thinks John is a fool, Bill thinks Bill is a fool, and Bill's wife doesn't think Bill is a fool. It is not possible to have three copies of the same VP "thinks he's a fool" to permit this reading, regardless of whether "he" is a bound or a free pronoun. If it is bound, we get the reading in (c) that Bill's wife thinks that Bill's wife is a fool. If it is free, we get the reading in (b) that Bill doesn't think that John is a fool.

In the face of these facts, one cannot both maintain that the bound/free distinction determines strict or sloppy readings, and that an identity condition governs VP ellipsis.

Dalrymple, Shieber, and Pereira (1991) argue that the identity condition should be rejected, and they retain the correlation between bound variables and sloppy readings. They suggest that VP ellipsis is to be resolved by a backward-looking mechanism, in which a property is extracted from the antecedent clause when an elliptical VP is reached. This is done by solving an equation in which the antecedent clause is equated to a expression in which a second order property variable is applied to the subject. Solutions to this equation are in the form of lambda expressions denoting properties. For a given solution to this equation, a sloppy reading is possible only for bound variables within this lambda expression. I briefly describe the application of their approach to the current example.

To resolve the ellipsis in (b) the equation to be solved is

P(John) = think(John, fool(John))

Intuitively, the question is, what property could have been applied to John, to produce the proposition in (a). The equation is solved by a process of second order matching, which is defined in terms of lambda calculus derivations. Two possible solutions are:

P = λx. think(x,fool(x))

Q = λx. think(x, fool(*John*))

Solution *P* gives the desired reading for (b), i.e., P applied to Bill gives the reading

think(Bill, fool(Bill))

Next, to resolve the ellipsis in (c), we solve the equation

P(Bill) = think(Bill, fool(Bill))

Again there are two possible solutions:

P' = λx. think(x,fool(x))

Q' = λx. think(x, fool(*Bill*))

Here, we select Q', which applied to Bill's mother, produces:

think(Bill's mother, fool(Bill))

The sloppy reading arises when the term for the pronoun "he" is the bound variable x; a strict reading arises if it is represented by a constant. Thus Dalrymple, Shieber and Pereira retain the hypothesis that the bound/free distinction tracks sloppy/strict readings, but the bound/free variable distinction is not a fact about the antecedent, but a fact about particular solutions produced by the matching mechanism. And they argue that no identity condition can be imposed.

In contrast, I will reject the claim that a bound/free distinction tracks strict and sloppy readings. This will allow me to maintain an identity condition at the discourse level. In addition, I will argue that "sloppy" readings for pronouns are possible for a much broader range of cases than could be captured by any reasonable notion of what constitutes a bound variable, so that the examples considered in this section are just special cases of a more general phenomenon.

4 A Discourse Model Approach

I suggest that VP ellipsis is not governed by any syntactic or logical form identity condition; rather, the relevant condition is "identity of file-change potential". The "file-change potential" of a VP is a three place relation $< DM_{in}, P, DM_{out} >$ on a property P and an input and output discourse model. That is, a VP specifies a property relative to a given discourse context. If the antecedent VP contains any contextually- dependent elements, such as referential pronouns, they are interpreted independently in the target context.

In previous accounts it has been argued that pronouns can switch reference from antecedent to target only when they are construed as bound variables. As the following examples show, free pronouns can also switch their referent from antecedent to target.

(9) a. I told John$_i$ that I didn't **expect him$_i$ to fail his$_i$ exam.**

b. I told Bill$_j$ that I did. [expect him$_j$ to fail his$_j$ exam]

(10) a. I never expected **John$_i$ to fail his$_i$ exam.**

b. Bill$_j$, I did.[expect to fail his$_j$ exam]

(11) a. If Tom$_i$ was was having trouble in school, I wouldn't **help him$_i$**.

b. If Harry$_j$ was having trouble, I guess I would. [help him$_j$]

(12) a. If women$_i$ are often frustrated because men$_j$ do not **respond to their$_i$ troubles by offering matching troubles**,

b. men$_j$ are often frustrated because women$_i$ do. [respond to their$_j$ troubles by offering matching troubles]
(*That's Not What I Meant*, Tannen 1990.)

In each of these examples there is a pronoun within the antecedent VP that does not corefer with the subject, and thus cannot be construed as a bound pronoun. However, in each case, the pronoun changes its referent to something that has become salient in the target context. This is not permitted by any of the accounts mentioned above. These examples show that the antecedent and target VP's are interpreted independently in their respective discourse contexts. Examples that do accord with the LF constraints, such as (6) and (7), are those in which the discourse context does not change significantly between antecedent and target VP.

My claim is that it is the meaning of the antecedent VP that is reconstructed, where meanings are taken to be "file-change potentials", i.e., relations on discourse models. The input and output discourse models can be thought of as partial assignment functions, and the file-change potential of a VP can be thought of as a property which may have some free variables. For example, the VP "help him" denotes the property of helping some salient individual, where the identity of that individual is determined by the input discourse model. In example (11) the antecedent VP determines the property "help Tom" because of the current state of the discourse model. In the target context, the VP determines a different property: "help Harry".

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It has long been recognized that semantic representations involves this sort of reference to context. In Montague's Universal Grammar (1974), the meanings of sentences and all subexpressions have a specific context parameter. For example, VP-meanings are defined there as functions from contexts to properties. Since Montague, the elaboration of utterance context and its interaction with interpretation has been an important topic in logic and linguistics. The development of Discourse Representation Theory (DRT) in Kamp (1980) and Heim (1981) can be seen as a sustained argument for treating meanings as relations on contexts. This is most clear in compositional approaches to DRT, such as Dynamic Predicate Logic. The Incremental Interpretation System is a computational implementation incorporating this relational approach to semantic representations. Elsewhere (Hardt 1991), I describe how my approach to VP ellipsis can be computationally implemented as an extension to this system. Here, VP- meanings are stored in a discourse model as potential antecedents for VP ellipsis, just as entities are stored as antecedents for pronominal anaphora.

5 Constraints on Reference Resolution

I have shown that the alphabetic variance condition is violated in cases where the target context differs significantly from the antecedent context. Based on examples of this sort, I have argued that the "identity of file-change potential" account is superior to an identity of LF account. The LF identity approach appears most plausible if one restricts attention to examples in which the antecedent and target contexts are very similar. However, even with respect to such examples, the current approach may have certain advantages over the LF identity approach. In this section I will argue that an LF identity condition is not required to explain the apparent strong constraints in these cases. In addition, it may be that the constraints can be relaxed due to other pragmatic factors, which would not be expected on an LF identity approach.

Consider the following questionable readings of example (6):

(13) John$_i$ **saw him$_j$**. Bill$_k$ did too. [saw him$_l$] ??

(14) John$_i$ **saw him$_j$**. Bill$_k$ did too. [saw him$_i$] ??

While these readings are ruled out by the alphabetic variance condition, the questionable nature of these readings can be explained without recourse to such a condition. Consider the non-elliptical counterpart of example (6). The readings above would be no better, in the absence of deictic gestures or intonational emphasis. Thus these facts appear to reflect general constraints on the resolution of referential pronouns in context.

The Centering model (see Grosz, Joshi, and Weinstein 1983, 1986) attempts to capture these constraints. According to this model both of the above readings would be ruled out or given a low preference. The reading in (13) is ruled out because of the requirement that a pronoun must find its antecedent in either the current or immediately preceding utterance; since entity l has not been mentioned in these two utterances, it is not a possible referent for the pronoun. The reading in (14) is given a low preference, because it would require a "center shift". Simplifying slightly, this can be explained as follows: according to the Centering model, for every utterance there is a unique entity that is termed the "backward- looking center", termed the Cb. If there are any pronouns in an utterance, one must refer to the Cb. Thus if there is only one pronoun, it *must* refer to the Cb. In example (14) above, entity j must be the Cb in the first utterance. Thus the reading in (14) causes a "center shift", since entity j is not mentioned in the second utterance. This is permitted, but a reading in which a center shift is avoided is preferred.

Although the alphabetic variance condition seems to make correct predictions in a simple case like (6), where there is little change in context between antecedent and target, it does not explain why similar constraints hold on the non-elliptical counterpart of (6). Even in such simple cases, where there is no intervening material between antecedent and target, it may be possible to find violations of the alphabetic variance condition. The following discourse is attributed to Lauri Karttunen in Dalrymple (1991):

> John and Bill were staying in different cities. They didn't know it, but they were each being chased by an FBI agent. The agent that was chasing John was staying in the same hotel, and the agent that was chasing Bill was posing as an employee of the restaurant where Bill ate. John's agent passed him in the hall every day, and Bill's agent usually served him breakfast. However, John didn't realize he was an FBI agent, and Bill didn't either.

The intended reading is "John$_i$ didn't realize he$_j$ was an FBI agent, and Bill$_k$ didn't [realize he$_l$ was an FBI agent] either". I find this reading somewhat marginal, though not impossible, as is implied by the alphabetic variance condition. The reading also appears to violate the Centering constraint mentioned above; entity l (Bill's FBI agent), was not evoked in the immediately preceding utterance. However, one might argue that entity l is "indirectly evoked". It seems reasonable to argue that, in this context, "John" and "Bill" each evoke their respective FBI agents.

Consider the following example:

> Harry went to lunch to meet his old friend Tom, who he hadn't seen in 20 years. Harry recognized him immediately. Tom didn't though.

Here the intended reading is "Harry$_i$ recognized him$_j$... Tom$_j$ didn't [recognize him$_i$]". Again, this reading would violate the alphabetic variance condition.

6 Conclusions

I have argued that no syntactic or logical form identity condition is compatible with the facts of VP ellipsis. I presented a range of general evidence for a discourse level approach, including non-linguistic antecedents, non-syntactically parallel antecedents, inferrable antecedents, combined antecedents, and long-distance antecedents. None of these phenomena are surprising for a discourse-level phenomenon. However, it is difficult to imagine any explanation of them at a syntactic or logical form level.

Standard accounts predict that pronouns within the antecedent VP can only switch referent in the target if they are bound by the subject. I have shown that pronouns in fact have more flexibility in switching reference than is predicted by these accounts, and I suggested an alternative identity condition on VP ellipsis, which I call "identity of file-change potential". On this approach, VP's are treated as relations on input and output discourse models. This provides a natural explanation for the facts about pronouns switching reference. In addition, it is an appropriate level at which to address the range of evidence for a discourse level approach, described in section 2.

The plausibility of the LF identity condition results from two factors: first, the contexts of the antecedent and target VP's tend to be similar, and second, the resolution of referential pronouns is itself highly constrained by context. I have shown that, when context changes significantly between antecedent and target, the LF identity condition is violated. Even in cases where the context is very similar, the facts are better explained by general constraints on pronoun resolution.

Footnotes

*. Thanks to Mary Dalrymple, Shalom Lappin, Robert Frank, Aravind Joshi, Christine Nakatani, Dick Oehrle, Mats Rooth, Mark Steedman, Stuart Shieber, Lyn Walker, and Bonnie Webber for helpful discussion and suggestions.

1. The "target" is the reconstructed elliptical VP.

2. For clarity, I write the antecedent VP in bold, and the target, or reconstructed VP, is displayed in brackets.

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ESCOL '91 130-141

TEMPORAL ADVERBS AND THE STRUCTURE OF REFERENCE AND EVENT POINTS *

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0. Introduction

This paper examines sentences with "imperfect past" verbs in Spanish. It will be shown that the tense morpheme - aba /ía representing the "imperfect past" in Spanish is ambiguous with respect to Temporality or Modality.

Spanish imperfect past sentences, henceforth -aba sentences, have both Temporal and a Modal usages. In their Temporal usage they denote past time reference, as (1)a illustrates:

(1) Juan cantaba ayer
Juan sing-aba (Past Tense -Imperfective Aspect) adverb ("Juan was singing yesterday")

In their Modal usage they describe expected situations or potential actions in the future, past or present, this being spelled out by a temporal adverb:

(2) Juan cantaba mañana/ayer/hoy
Juan sing-aba-adverb ("Juan was going to/was to/was supposed to sing tomorrow/yesterday/today"

In this paper, I adopt a modified Reichenbachian analysis of Tense construal to describe the configuration of the imperfect past tense in Spanish.

FOOTNOTES

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*. I would like to thank all the people who discussed previous versions of this article with me and whose comments and suggestions have contributed to it. Special thanks to Karen Zagona and Tim Stowell for listening patiently to my arguments. Many thanks to Carlos Otero, Dominique Sportiche, C.A.Quicoli, A.Szabolcsi, A.Kratzer and K.Ming Sung. I am the only one responsible for the errors this paper may have.

This article was written with the support of a Fulbright / Ministerio de Educación y Ciencia grant from the government of Spain.

The analysis of Tense construal in the Reichenbachian model involves a linear structure between times: speech time (S),reference time (R) and event time (E). S, R and E are ordered with respect to one another.

Based on evidence from imperfective past sentences in Spanish,I claim - contrary to Reichenbach (1947) and following Comrie's (1985) proposal for the Basic Tense Structure (BTS) of the Future Perfect - that the BTS for Modal -aba sentences is non -linear. Evidence in support of this claim is that in Modal -aba sentences,the time of the event may either precede or follow the time of speech,as illustrated by (3). This precludes a linear representation of these two time points in which the time of the event (E) and the time of speech (S) are ordered with respect to each other in the Basic Tense Structure. (3)b and (3)c show that the event (singing,in this case) can either precede or follow the time of speech :

(3) Creo que Plácido Domingo cantaba en el "Palace"
"I believe that P.D. was going to/was to/was supposed to sing in the "Palace" "

(3) does not specify when is the event supposed to take place. The event of singing can happen before speech time,with an interpretation like (3)b:

(3) b. Plácido Domingo cantaba en el Palace ayer
"P.D was supposed to sing in the "Palace" yesterday"

or,alternatively,the event of P.D's singing can take place after speech time,with an interpretation like (3)c:

(3) c. Plácido Domingo cantaba en el Palace mañana
" P.D. was supposed to sing in the "Palace" tomorrow"

Adopting a non linear Basic Tense Structure for -aba sentences with a Modal interpretation is preferable to a linear BTS for a clear reason: a non linear BTS is able to capture the fact that in these types of sentences (cf. (3)) the time of the event and the time of speech are not ordered with respect to each other.

Concerning temporal adverbs I assume that their role in -aba sentences is to bind either the reference time (R),the verb (V) - which is identified with the event - or Inflection (I). It is argued that ,in Modal -aba sentences,the adverb binds the Inflection (I),placing the event either before or after the speech time: a past adverb such as ayer (yesterday) places the event before speech time,as (3)b illustrates; a future adverb such as mañana (tomorrow) places the event after speech time,as (3)c shows.

In Temporal -aba sentences,the adverb binds either the reference point or the verb - which is identified with the event point -. Since the R point and the E point are associated in BTS,either one may be bound.

I assume that presentential adverbs bind the reference time (R) and postverbal adverbs bind either the Inflection (I) or the verb (V) - which is identified with the event (E) -. This suggests that there is a hierarchy between R and E. In this paper I will claim that the reference time c-commands the event based on evidence from double temporal adverbs.

1. The ambiguity of the Imperfect Past Morpheme -aba

The imperfect past morpheme -aba is ambiguous in two respects:

- Ambiguity #1: it denotes either Tense (Past) or Modality (Potential).
- Ambiguity #2: in the Modal interpretation , -aba sentences can place the event either in the Past or in the Future.

It is generally assumed that the traditionally called imperfect past morpheme -aba represents a past tense that denotes an "imperfective" aspect where the action of the verb is perceived as continuous.Although this observation is accurate, in this paper I argue that the imperfect past morpheme does not exclusively correspond to a past tense interpretation but it rather corresponds to two different "tenses":

(i) a Past Tense with a Temporal interpretation [Past],as illustrated by (1) and (4):

(4) Juan tocaba el violín mientras Pepe bailaba [1]
"Juan was playing the violin while Pepe was dancing"

FOOTNOTES

[1]. I ignore the so called "habitual" interpretation of the imperfective past tense,that is,the one in which (4) is interpreted as "Juan used to play the violin".The relevant interpretation of (4) is one identical to (4)' where there is a temporal adverb [Past]:

(4)' Ayer, Juan tocaba el violín mientras Pepe bailaba
"yesterday, J.was playing the violin while P.was dancing"

(ii) a non Past Tense with a Modal interpretation,as illustrated by (2),(3) and (5) a :

(5) a. Creo que María se examinaba
"I believe that Maria was going to/was to/was supposed to take an exam"

In the Temporal interpretation (cf. (1) and (4)),the time of the event is past with respect to the time of speaking.This can be represented in Tense structure as (6),that corresponds to (1) and (4):

(6) E____S (= (1) Juan cantaba ayer)
"Juan was singing yesterday"

The second type of ambiguity occurs within the Modal interpretation of -aba sentences. Contrary to the temporal reading, in the Modal interpretation ,the time of the event can be either past or future with respect to the time of speaking. Note that (5) a ,like (3), does not specify when is the event supposed to take place. It can take place either in the past or in the future.

(5) a. has two possible interpretations,as illustrated by (5)b and (5)c:

(5)b. María se examinaba ayer
"Maria was supposed to take an exam yesterday"
E___S (with the event before speech time)

(5)c. María se examinaba mañana
"Maria was supposed to take an exam tomorrow"
S___E (with the event after speech time)

The temporal adverb spells out the two possible interpretations (5)a. has.

While in the Temporal interpretation the event of singing has happened in the past - we know the time of the event is prior to the time of speaking - the Modal interpretation differs from the Past Tense reading in two important points. In the absence of adverbs,as (5)a illustrates:

1. it is unknown whether the event has happened or not (if the event hasn't happened,the sentence is [-realis])
2. it is unspecified whether the time of the event is prior to the time of speaking or it is posterior [2]

2. The Basic Tense Structure of Modal and Temporal -aba sentences

In this paper,I claim that the Basic Tense Structure (BTS) of Modal -aba sentences is non linear. The reason for this claim is that a non linear BTS correctly captures the fact that the time of the event and the speech time are not ordered with respect to each other,as illustrated by (3) and (5)a. (3) and (5)a. provide evidence that the event can in fact be either past or future with respect to the speech time (cf.(3)b.,c. and (5)b.,c). The advantage of this claim over previous proposals (Reichenbach (1947)) is the following: it represents the correct relation between E and S: E and S are not ordered with respect to each other. A BTS like the one in Reichenbach (1947) fixes an order between

FOOTNOTES

[2].The Modal usage of -aba is parallel to counterfactuals:

(7) If you did this,I would be very happy (Comrie (1985), 19).

Comrie (1985) points out that "...'did' clearly does not have a past time reference ,but refers rather to a potential action in the present or future".

I assume that something rather similar applies to the imperfect past in Spanish in its Modal interpretation: the morpheme -aba does not always have a past time reference ,but refers rather to a potential or expected event in the past or in the future.

I argue that the imperfect past in its Modal reading is very similar to a conditional tense in disguise.It shares with the conditional the feature [-realized] and its counterfactual meaning. Evidence for this claim is the fact that in informal speech the conditional tense is changed for an imperfective past (an -aba verb).It is common to find an imperfect past where we would expect a conditional:

(8) Si me contaras el secreto te REVELABA la información
"if you told me the secret I would reveal you the information"

(9) Si le dieras más dinero,te AYUDABA a encontrarlo
"if you gave him more money,he would help you find it"

"revelaba" stands for the conditional "revelaría" and "ayudaba" stands for the conditional "ayudaría".

E and S. Thus, a non linear BTS is more adequate than a linear one.

2.1. Analysis of Tense Construal in Reichenbach (1947):

The main idea in Reichenbach's (1947) analysis is that tenses are complexes of three theoretical entities,i.e., the time of the event (E),the time of speaking (S) and the Reference point (R). The order in which these three points appear determines the tense of the sentence. These three elements (E,S and R) are ordered by two types of relations -Associativity and Linearity-. Associativity determines the following: points separated by a comma are interpreted as contemporaneous:

(10) John is dancing   S,R,E

S,R,E represents the present tense,where the time of the event,the time of speaking and the reference point are all associated,and thus interpreted as the same point in time.

Linearity determines the precedence relations of E,S and R.The past tense represents the time of the event (E) preceding the time of speaking (S):

(11) John danced   E,R____S

The future tense describes the time of the event as following the time of speaking:

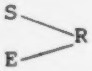
(12) John will dance   S____R,E

The tense structures in the system in Reichenbach (1947) are linear,i.e.,the three time points are ordered with respect to one another.

2.2. The Basic Tense Structure (BTS) of Modal -aba sentences

In this paper I adopt an non linear BTS for the imperfective past with a Modal interpretation that follows the proposal in Comrie (1985) for the BTS of the Future Perfect. The BTS he proposes is the following:

(13)



Comrie (1985) argues that a non linear BTS such as (13) captures the three different readings the Future Perfect may have.The example cited to illustrated this point is:

(14) John will have finished his manuscript by tomorrow (Comrie (1985),71)

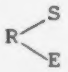
He argues that (14) may be felicitously and truthfully uttered in three sets of circumstances:

> ..." One set of circumstances is where John finishes his manuscript between the moment of my uttering this sentence and the reference point "tomorrow". The second is where John is in fact finishing his manuscript at this very moment but I am unaware [...] of this fact. The third is where John has already finished his manuscript,but I am unaware [...] of the fact. Thus the time reference of John's finishing his manuscript is left open as to whether it is future,present or past relative to the present moment,the only stipulation being that it must be prior to the reference point in the future,the sine qua non of the future perfect" (Comrie (1985),71).

A non linear BTS like (14) is able to establish a relation between E and R and between R and S without establishing a relation between E and S.

In this paper I claim that Modal -aba sentences are parallel to the Future Perfect in that the time of the event (E) and the speech time (S) are not ordered with respect to each other since it is the case that E can either precede or follow S,as (3) and (5) illustrate [3]. A non linear BTS is needed to capture this. Thus,I propose the following BTS for Modal -aba sentences:

(15)



Sentences like (3) or (5)a. have the BTS in (15),where the time at which the event takes place is not determined

FOOTNOTES

[3] There is crucial property that is parallel for the Future Perfect and Modal -aba. The R in the Future Perfect is always in the future and the R in Modal -aba is always in the past. I will come back to this point.

with regard to speech time (time of sentence uttering in Comrie's (1985) words).

2.3. The relation between E and S and the relation between E and R in Tense -aba sentences

I assume that a sentence such as (4),repeated here as (16) has the BTS in (17):

(16) Juan tocaba el violín (mientras Pepe bailaba)
"Juan was playing the violin while Pepe was dancing"

(17) E , R___S

The relation between the time of the event (E) and speech time (S) is straightforward: in the Past Tense interpretation of -aba sentences,the time of the event precedes speech time.

The relation between the time of the event (E) and the reference time (R) is the following: E and R refer to the same point in time,that is [Past].This is the reason why they are represented associated to each other in Tense Structure.

2.4. The relation between E and S and the relation between E and R in Modal -aba sentences

In the Modal interpretation of -aba sentences,it is unknown whether the event (E) precedes or follows speech time (S),since both options are available.
The relation between the time of the event (E) and speech time (S) is undetermined -and therefore unordered in BTS as illustrated by a Modal sentence such as (3). (3) allows two different interpretations; one in which the event precedes speech time and another interpretation in which the event follows speech time,as was illustrated by (3)b and (3)c respectively.

The relation between the event (E) and the reference point (R) is the following: the point of reference precedes the time of the event,as illustrated by (18):

(18) R___E

Evidence comes from the following sentences:

(19) a. Ayer,Plácido Domingo cantaba mañana (pero se canceló el concierto)

"Yesterday,P.D. was supposed to sing tomorrow,(but the concert was cancelled)"

b. Antesdeayer,Plácido Domingo cantaba ayer (pero se canceló el concierto)
"The day before yesterday,P.D. was supposed to sing yesterday (but the concert was cancelled)"
c. Hasta hace cinco minutos,Plácido Domingo cantaba a las dos (pero se canceló el concierto)
"Five minutes ago,P.D. was supposed to sing at two (but the concert was cancelled)"

I follow Hornstein (1977) in assuming that adverbs in presentential position are related to the reference point and adverbs in sentence final position are related to the event.Note that in (19)a,b and c,the adverb representing the time of the reference is [Past] with respect to the adverb representing the time of the event.

It can be concluded that the reference time is in the past with respect to the time of the event.

Further evidence in favour of arguing that the reference point is anterior to the event comes from the following ungrammatical sentences:

(20)a. * Mañana,Juan cantaba mañana
"Tomorrow,Juan was supposed to sing tomorrow"
b. * Pasado mañana,Juan cantaba mañana
"The day after tomorrow,J.was supposed to sing tomorrow"

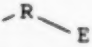
(20)a. shows that the adverb related to the reference time (the presentential adverb) cannot refer to the same time as the adverb related to the event (the post sentential adverb) and (20)b shows that the presentential or "reference adverb" cannot represent a future time with respect to the postverbal or "event adverb".

At this point I will provide an answer to the following question: what is the evidence that there are two different BTS,one for the Tense -aba and another one for the Modal -aba sentences?. There are two important pieces of information for Modal -aba sentences: we know the reference point is [Past] with respect to the time of the event (R___E),as illustrated by (19)a,b,c, and we also know that R and E are not associated,as shown by the same examples,since there are two different adverbs representing two different times.This is all we need to conclude that the order between R and E in Modal -aba sentences is: R___E, which is different to the order E,R characteristic of Tense -aba sentences.

The Role of the Temporal adverb in -aba sentences

3.1. The Hierarchy between R and E: I claim that the reference point (R) c-commands the event (E) in a hierarchical structure similar to X'Theory [4]:

(21)



I assume, following Zagona (1990), that the [+/-Finite] head of a clause selects an internal temporal argument, "Event time" and that the C-selection associated with the internal argument of F^{0} is VP. I will therefore assume that E = VP.

I will assume that adverbs bind and I also assume that there is a difference between presentential and postsentential adverbs with respect to the element they bind. Presentential adverbs bind the reference time, as illustrated by (22):

(22) Ayer, Juan cantaba ("yesterday, John was singing")

Postsentential adverbs bind:

A. The verb (V) (which is the event time (E) under the assumption above). A postsentential adverb binds the event (E) if the adverb is [+realis], that is, an adverb that spells out the temporal usage of -aba sentences such as ayer (yesterday), as illustrated by (23):

(23) Juan cantaba ayer ("John was singing yesterday")

B. The Inflection (I): if the adverb is [-realis], that is, an adverb that spells out the Modal usage of -aba sentences such as mañana (tomorrow), as (24) illustrates:

(24) Juan cantaba mañana ("John was supposed to sing tomorrow") ((24) is analogous to (3)c and (5)c)

FOOTNOTES

[4] My claim has some relation with the observation in Hornstein (1977):531 that presentential adverbs relate to R and postsentential adverbs relate to E. The examples he cites are:
(30) At 3 p.m, John had left the store
(31) John had left the store at 3 p.m.

Modal ([-realis]) adverbs,such as mañana determine the order between the time of the event and speech time.Recall that the relationship between these two time points is undetermined in the non linear BTS proposed in (15).A past adverb such as ayer (yesterday),places the event before speech time,yielding the Derived Tense Structure (DTS): E___S that corresponds to (3)b and (5)b. A future adverb such as mañana (tomorrow) places the event after speech time,yielding the DTS: S___E that corresponds to (3)c and (5)c.

Although I will not fully develop the question of adverb position in Spanish in this paper,there is some evidence suggesting that different D-structure positions determine whether the adverb binds the time of reference, the verb (V) - which is identified with the time of the event - or Inflection (I). I tentatively suggest that adverbs right adjoined to IP are Modal ([-realis]) and bind the Inflection (I) whereas adverbs inside VP are Temporal ([+realis]) and bind the verb V (which is the event (E)). Presentential adverbs are left dislocated and are linked to a VP internal position where Temporal adverbs are at D-structure.Evidence that presentential position must be linked exclusively to a VP internal position where only Temporal ([+realis]) adverbs are located is the fact that only Temporal ([+realis]) adverbs may be in presentential position,as (25)a,b illustrate:

(25)a. * Mañana,Juan cantaba (Modal [-realis] adverb)
"tomorrow,John was to sing"
b. Ayer,Juan cantaba (Temporal [+realis] adverb)
"yesterday,Juan was singing"

The ungrammaticality of (25)a is also a consequence of the adverb mañana binding the reference point (R).There is a mismatch in temporal features between the adverb and the reference point ; mañana (tomorrow) is a [Future] adverb and the reference point (R) is [Past],as previously determined.

4. Conclusion

In this paper I have claimed that the imperfect past tense in Spanish ,represented by the verbal morpheme -aba/ía has two different Basic Tense Structures (BTS) that correspond to the different interpretations this morpheme can have. Imperfect past sentences,in their Modal or [-realis] interpretation have a non linear

BTS.The argument supporting this claim is that the time of the event and speech time are not ordered with respect to each other and only a non linear BTS is able to capture this. Imperfect past sentences,in their Temporal or [+realis] interpretation have a straightforward BTS that is linear and is analogous to the BTS of the simple past in English.

I have claimed that there is a hierarchy between the reference time (R) and the event (E) in which the reference time c-commands the event. Evidence for this claim is given by double temporal adverbs where the presentential one relates to R and the postsentential one relates to E (cf.(19)).

I have assummed that adverbs bind. I have claimed that different D-structure positions for the temporal adverb determine which element they bind. I have tentatively proposed that temporal adverbs right adjoined to IP are [-realis] (they spell out a Modal interpretation for the sentence) and they bind Inflection (I). Temporal adverbs inside VP are [+realis] (they spell out a Temporal interpretation for the sentence) and they bind the verb (V) - which is identified with the event, following Zagona (1990)-. Presentential adverbs bind the reference time.

The fact that Spanish verbs in the imperfect past form can have a Modal or [-realis] interpretation supports my claim that,in this particular usage,the verb expresses a true conditional tense.

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ESCOL '91 142-159

WHAT DOES CONCEPTUAL STRUCTURE HAVE TO DO WITH SYNTACTIC THEORY?[1]

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1. Introduction: What is conceptual structure?

In order to say what conceptual structure has to do with syntactic theory, I must first say what I think conceptual structure is. Let me start by mentioning Chomsky's (1986) distinction between two views of language. The first, *E-language* or "externalized language," sees language as an external artifact, existing independently of speakers. The other, *I-language* or "internalized language," sees language as a set of mental principles that account for linguistic understanding and use. In studying the semantics of natural language, I am adopting the latter view, in consonance with the view of language adopted in generative grammar: I am interested in the mental representations that support thought. We can call this inquiry the study of *I-semantics*. It contrasts with standard formulations of truth-conditional semantics, which purport to study the relation of language to the world independent of speakers, i.e. *E-semantics*.

The basic hypothesis underlying Conceptual Semantics, the particular version of I-semantics I have been pursuing, is that there is a form of mental representation called *conceptual structure* that is common to all natural languages and that serves as the "syntax of thought."[2] I envision conceptual structure as a computational form that encodes human understanding of the world.[3] Because there is an unlimited number of possible concepts, the potentiality for forming concepts must be mentally encoded as a finite set of primitives and principles of combination, which may collectively be called the formation rules for conceptual structure.

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[1] Most of the material in this paper summarizes positions developed in greater detail in Jackendoff (1987b, 1990). The new parts are sections 3 and 6, the latter of which is worked out more thoroughly in Jackendoff (1992). This research was supported in part by NSF Grant IRI 90-46528 to Brandeis University.

[2] I use this term to distinguish my notion of conceptual structure from Fodor's (1975) "Language of Thought"; the latter carries with it the property of intentionality, from which I wish to distance myself. See Jackendoff (1990, 1991) for discussion.

[3] However, conceptual structure is not the only form of representation available to encode one's understanding of the world. Aspects of the world that are understood spatially are encoded in another central representation whose properties resemble Marr's (1982) 3D model structure (see Jackendoff 1987a, Jackendoff and Landau 1991 for discussion); there may well be other central representations as well, for instance a "body representation" that encodes the position and state of the body. What distinguishes conceptual structure from these others is its *algebraic* character — its being formalized in terms of features and functions — and its capacity to encode abstractions.

Various sorts of principles of mental computation interact with conceptual structures. Rules of inference, pragmatics, and heuristics can all be thought of as principles that license the formation of new conceptual structures on the basis of existing ones. Since conceptual structure serves as the form of linguistic meaning, there must also be a set of correspondence rules that relate it to syntactic representations, which serve as the expression of meaning. In addition, since the conceptualization of the world must be related to perception and action, conceptual structure must be linked by further sets of correspondence rules to the mental representations proprietary to the perceptual systems and to the production of action. The overall layout of the theory is shown in Figure 1.

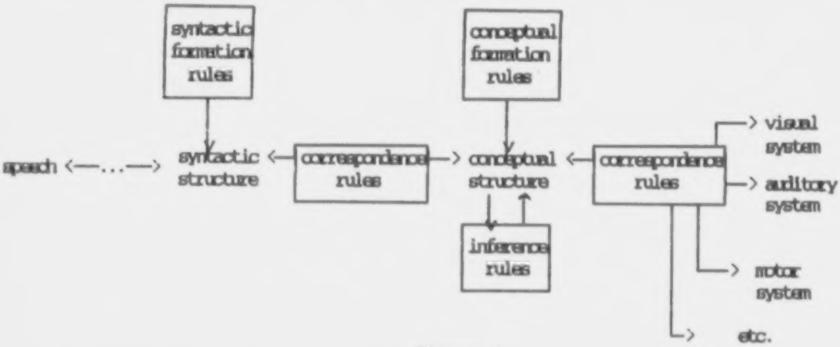

Figure 1

Accordingly, the goal of Conceptual Semantics is to articulate each of the systems of principles in Figure 1: (1) the formation rules for conceptual structure, that is, the primitives and principles of combination that collectively generate the infinite class of possible concepts -- including both lexical concepts (word meanings) and phrasal concepts (a special case of which are sentential concepts or propositions); (2) the rules of inference, pragmatics, and heuristics; (3) the correspondence rules between conceptual structure and the other representations with which it interacts. None of these goals, of course, can be pursued in isolation; they are intimately interdependent.

Within this framework, a lexical item can be seen as a correspondence between well-formed fragments of phonological, syntactic, and conceptual structure. Hence the lexicon is conceived of as part of the correspondence rule component. The leading issues of lexical semantics then come to be framed as: (1) What fragments of conceptual structure can be encoded as lexical items (of, say, English)? (2) When lexical items are combined syntactically, how are they correspondingly combined in conceptual structure, and what principles license these correspondences?

What bearing does this framework have on syntactic theory? Many syntacticians will say, This is all well and good, but what does it have to do with my work? I'll try to give you some idea.

2. The formal definition of θ-roles, θ-marking, and argument structure

The first thing I want to show is how various notions that are crucial to the definition of D-structure in syntax can be provided with formal definitions in terms of the independent level of conceptual structure.

One basic correspondence rule between syntax and semantics (Jackendoff 1983, chapter 4; Jackendoff 1990, chapters 2 and 3) concerns the relation between syntactic argument structure and thematic roles in conceptual structure:

Correspondence principle (Neo-θ-criterion) Each syntactic argument corresponds to one or more thematic roles, where each thematic role is identified as an argument position in conceptual structure.

Note that the principle allows for one or more thematic roles; the uniqueness of correspondence postulated by the standard interpretation of the θ-Criterion (Chomsky 1981) is not observed. Nor is the rule biconditional: as will be seen in a moment, there are thematic roles that do not correspond to syntactic arguments.

To illustrate this correspondence, using the technology and notation of Conceptual Semantics, consider the relation between syntactic structure (1a) and conceptual structure (1b). (I will refine (1b) shortly.)

(1)
a. John sold a book to Bill.
b.

$$\left[_{\text{Event}}\begin{array}{l} \text{GO}_{\text{Poss}}\left([_{\text{Thing}}\ \text{BOOK}], \left[_{\text{Path}}\begin{array}{l}\text{FROM } [_{\text{Thing}}\ \text{JOHN}] \\ \text{TO } [_{\text{Thing}}\ \text{BILL}]\end{array}\right]\right) \\ \left[\text{EXCH } \left[_{\text{Event}}\ \text{GO}_{\text{Poss}}\left([_{\text{Thing}}\ \text{MONEY}], \left[_{\text{Path}}\begin{array}{l}\text{FROM } [_{\text{Thing}}\ \text{BILL}] \\ \text{TO } [_{\text{Thing}}\ \text{JOHN}]\end{array}\right]\right)\right]\right] \end{array}\right]$$

Let me unpack (1b). Paralleling the notation for syntactic structure, the square brackets in (1b) identify conceptual constituents. Each constituent is labeled as belonging to a major conceptual category or "semantic part of speech" — one of the kinds of entities the world is conceptualized as containing, for example Thing (or physical object), Event, State, Path (or trajectory), Place (or location), Property, Time, and Amount. For now, the expressions BOOK, JOHN, BILL, and MONEY are unanalyzed (though they certainly have further internal structure). The expressions GO, FROM, and TO are basic conceptual functions; EXCH is a subordinating function that adds a subordinate Event as a modifier of the main Event; Poss is a semantic field feature, distinguishing change of possession from spatial motion. To paraphrase (1b) informally, there is an Event consisting of a book changing possession from John to Bill, in exchange for money changing possession from Bill to John.

We see in this example how the standard thematic roles can be structurally defined. The Theme, or thing in motion, is the first argument of the function GO; the Source, or initial point of motion, is the argument of the function FROM; the Goal, or final point of motion, is the argument of TO. For example, in the main Event of (1b), BOOK is Theme, JOHN is Source, and BILL is Goal. This is an essential feature of Conceptual Semantics: thematic roles are treated as structural positions in conceptual structure, not as an independent system of diacritics in syntax.

Now recall that the Neo-θ-Criterion says that each syntactic argument corresponds to one or more thematic roles. In (1b), for instance, JOHN is both Source of the main Event and Goal of the modifying Event; BILL is Goal of the main Event and Source of the modifying Event. The extra thematic roles in the modifying Event cannot be ignored: they must be present in the conceptual structure of (1a) in order to distinguish John sold a book to Bill from John gave a book to Bill, which lacks the subordinate Event.

Next, recall that the Neo-θ-Criterion is not biconditional: it does not stipulate that every conceptual argument corresponds to a syntactic argument. An example is the argument MONEY in (1b). For an act to count as selling, there must be a transfer of money, but the money need not be explicitly mentioned. Hence MONEY is an incorporated or implicit argument; the sentence John traded a book to Bill would have a different, less restricted implicit argument in the parallel position. In short, the notion of "implicit argument" has a formal definition in this framework: it is a conceptual argument that is not syntactically expressed. (Note however that the implicit argument in (1a) may be expressed by an adjunct such as for $5.)

To see in more detail how syntactic structure is placed in correspondence with conceptual structure, let us look at a simpler case for the moment; we will return to (1) in a while.

(2) a. Bill put the book into the box.

b. $$[_{\text{Event}}\ \text{CAUSE}\ ([_{\text{Thing}}\ \text{BILL}],\ [_{\text{Event}}\ \text{GO}\ ([_{\text{Thing}}\ \text{BOOK}],\ [_{\text{Path}}\ \text{TO}\ ([_{\text{Place}}\ \text{IN}\ ([_{\text{Thing}}\ \text{BOX}])])])])]$$

(2b) is placed in correspondence with the syntactic structure (2a) by virtue of the lexical entries in (3).

(3) a. $$\left[\begin{array}{l}\text{into}\\ \text{P}\\ [_{\text{Path}}\ \text{TO}\ ([_{\text{Place}}\ \text{IN}\ ([_{\text{Thing}}\ ]_{A})])]\end{array}\right] \qquad \begin{array}{r}\text{(phonological structure)}\\ \text{(syntactic structure)}\\ \text{(conceptual structure)}\end{array}$$

b. $$\left[\begin{array}{l}\text{put}\\ \text{V}\\ [_{\text{Event}}\ \text{CAUSE}\ ([_{\text{Thing}}\ ]_{A},\ [_{\text{Event}}\ \text{GO}\ ([_{\text{Thing}}\ ]_{A},\ [_{\text{Path}}\ ]_{A})])]\end{array}\right]$$

(3a) specifies that the phonological material into corresponds to a preposition in syntactic structure and to a certain expression in conceptual structure -- the item's "lexical conceptual structure" or LCS. The LCS in (3a) is a function of one argument, a Thing; the argument constituent is marked with the "linking subscript" A. An argument so marked must be expressed by a syntactic argument; by virtue of a general principle of linking, to which I will return in a moment, this syntactic argument will appear as the object of the preposition.[4] Thus the PP *into the box* in (2a) is mapped into the full Path-constituent in (2b).

Similarly, (3b) specifies that the phonological material *put* corresponds to a verb in syntactic structure and to a three-place function in conceptual structure. The three arguments of the function are subscripted A, and therefore must be expressed in the syntax; by the Linking Principle, they are expressed as the subject, object, and postverbal PP.

These examples show how Conceptual Semantics treats the "argument structure" or "θ-grid" of a lexical item. It is not a separate level of lexical representation (as in for example Stowell 1981; Williams 1984; Higginbotham 1985; Rappaport and Levin 1985, 1988; Grimshaw 1990); it is simply the collection of A-markings in the item's LCS. The structural positions of the A-marked constituents in turn determine the θ-roles of the syntactic arguments in the sentence; hence the process of θ-marking NPs amounts formally to linking NPs to the A-marked constituents of conceptual structure.

Next let us return to the Linking Principle that says how A-marked constituents are to be connected to syntactic arguments. In many proposals on argument structure and linking (e.g. Anderson 1977, Bresnan and Kanerva 1989, Foley and Van Valin 1984, Grimshaw 1987, Carrier-Duncan 1985, Larson 1988), there is a hierarchy of θ-roles, such that the subject is linked to the most prominent θ-role, the first object to the next most prominent θ-role, and, the second object, if there is one, to the third most prominent θ-role. Within the formalism of Conceptual Semantics, the θ-hierarchy falls out quite naturally: the θ-prominence of a conceptual argument is directly related to its depth of embedding in conceptual structure: Agents fall outside of Themes, which fall outside of Sources and Goals. (Some versions of the θ-hierarchy place Goal ahead of Theme, in violation of this ordering. The full notation for conceptual structure developed in Jackendoff 1990 accounts for this case; there is no space to deal with it here.) Thus the relevant principle can be stated like this:

NP Linking Principle: Match NP arguments of a verb, ranked in order of syntactic prominence, with A-marked conceptual arguments, ranked in order of embedding.

In (2), for instance, the NP arguments are linked to the Agent and Theme. The Agent, being least deeply embedded, is realized as the subject; the Theme, being next least deeply embedded, is realized as object. The Path argument, however, is linked to a PP, which does not fall under the rule. Rather, PP arguments are typically freely ordered, as long as they fall to the right of the NP arguments.

To sum up the discussion so far, the Conceptual Semantics formalism makes it possible to formally specify the nature of θ-roles, argument structure, implicit arguments, θ-marking, and the θ-hierarchy, and to provide a more empirically adequate version of the θ-criterion.

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[4] This treatment of linking differs from treatments in Jackendoff 1983, 1987b, where linking was stipulated by coindexing between the LCS and the syntactic subcategorization feature. The present treatment, which is more general, is developed in Jackendoff 1990, chapter 11.

3. Semantic and syntactic selection

We next consider the issue of argument selection. This falls into two parts. First, how do predicates restrict the semantic properties of their arguments? (This is called the problem of "selectional restrictions" in Chomsky 1965 and "s-selection" in more recent work.) Second, do predicates need to restrict syntactic properties of their arguments? (This is called "subcategorization" or "c-selection.")

The mechanism for semantically restricting arguments is implicit in the material already presented. In the LCSs shown in (3) above, notice that the A-marked constituents are marked for conceptual category such as Thing and Path. These markings restrict the categories of concepts that can be inserted into these argument positions. More generally, an A-marked constituent can contain a variety of conceptual material that specifies further restrictions. Consider, for instance, the verb drink, whose direct object must be a liquid. This can be specified in the LCS of drink like this (ignoring details that are for the moment irrelevant):

(4) $$[_{\text{Event}}\ \text{CAUSE}\ ([_{\text{Thing}}\ ]_{A}, [_{\text{Event}}\ \text{GO}\ ([_{\text{Thing}}\ \text{LIQUID}]_{A}, [_{\text{Path}}\ \text{TO}\ [_{\text{Place}}\ \text{IN}\ [_{\text{Thing}}\ \text{MOUTH}]]])]))]$$

When an argument is inserted into an A-marked position, it is not just substituted for the A-marked constituent; rather, it undergoes an operation of fusion (a form of unification) with the material in the A-marked constituent. Thus, (5a) will correspond to a conceptual structure in which the Theme is both solid and liquid, hence anomalous. On the other hand, if a syntactic argument is not specific with respect to features that are independently specified by the verb, the features provided by the verb are still present; hence we know that whatever Bill drank in (5b) is some sort of liquid, as well as something he liked.

(5) a. *Bill drank the powder.
    b. Bill drank something he liked a lot.

In other words, semantic selection is not just a filter on lexical insertion, as often conceived. Rather, it is a positive specification of features of an argument, in a format altogether uniform with specification of features external to arguments. (This characteristic appears also in HPSG (Sag and Pollard 1991).)

Next let us consider syntactic selection. Since Stowell 1981, there has been a strong presumption that syntactic selection is not necessary — that it can be taken care of by means of semantic selection plus case-marking. I find it possible to divide the issue into three parts: (a) whether a conceptual argument is syntactically obligatory, optional, or implicit; (b) whether a conceptual argument is expressed by a syntactic NP argument or by an oblique phrase; (c) what syntactic categories can be used to express a conceptual argument. Let me take them up in turn.

3.1. Optionality of arguments. The contrast between optional and obligatory arguments appears in the minimal pair (6).

(6) a. Bill ate (the apple).
    b. Bill devoured *(the apple).

This difference can easily be encoded in the A-marking of the verb's LCS, by making a distinction between optionally expressed and obligatorily expressed arguments. In Jackendoff 1990 this difference is notated as *<A>* vs *A*; the Theme of *eat* is marked *<A>* (optional argument) and the Theme of *devour* is marked simply *A* (obligatory argument). I now favor a slightly different notation, in which optionality is the unmarked case, and obligatoriness is marked by a privative feature *o* attached to the A-marking. In this notation, then, the Theme of *eat* is simply marked *A*, and that of *devour* is *Ao*. The reasons for this change will be evident in a moment; for now, it suffices to observe that optionality or obligatoriness of arguments is easily formalized as a property of the linking subscript.

3.2. Realization as NP arguments vs. oblique arguments. The contrast between NP arguments and oblique arguments can be illustrated by minimal pairs such as (7)-(8), in which the relevant arguments have been underlined.

(7) a. Bill gave Harry *a book*.
    b. Bill supplied Harry *with a book*.

(8) a. Bill put *a cloth* on the table.
    b. Bill covered the table *with a cloth*.

The role of the book is the same in both sentences in (7): it is the Theme, the object changing possession. Similarly, the cloth is the Theme in both sentences in (8): it is going onto the table. (In addition, the cloth may be construed as Patient in (8a), an issue which goes beyond our concerns here, but which is indeed relevant in the long run.) What licenses the (b) cases, and what determines the difference between them and the (a) cases?

Jackendoff 1990 shows that there is a general rule of correspondence in English, the "With-Theme Rule," which permits the object of *with* to be understood as a Theme, just in case there is not an A-marked Theme. That is, *with* in (7-8b) can be thought of as a "semantic case-marker" that marks Themes. Given the minimal semantic difference between the (a) and (b) realizations, the choice between them must evidently be lexically specified.

But this choice too can be dealt with in terms of the linking subscript: If the Theme is A-marked, then the NP argument realization appears; if the Theme is not A-marked, then the oblique realization is available. Thus *give* and *put* A-mark their Themes, whereas *supply* and *cover* do not.

A complication in this system concerns "obligatory adjuncts." Consider the minimal pairs in (9)-(10).

(9) a. Bill supplied Harry (with a book).
    b. Bill provided Harry *(with a book).

(10) a. Bill decorated the hat (with diamonds).
     b. Bill encrusted the hat *(with diamonds).

These pairs show that oblique arguments, like normal arguments, can be marked optional or obligatory.

In Jackendoff 1990, obligatory obliques were treated in terms of syntactic subcategorization of the oblique phrase. I now think this is incorrect, because it does not not properly distinguish the desired meaning for the *with*-phrase. For example, if *encrust* syntactically requires a *with*-phrase, all the sentences in (11) ought to be equally good. (This problem was pointed out by Kevin Hegg.)

(11) a. Bill encrusted the hat with diamonds. (Theme *with*)
     b. Bill encrusted the hat with tweezers. (Instrument *with*)
     c. Bill encrusted the hat with care. (Manner *with*)

This shows that what *encrust* requires is not a *syntactic* *with*-phrase, but rather a *with*-phrase that denotes Theme.

A different approach, which I now favor, is to treat the obligatory-optional distinction uniformly in normal and oblique arguments. A simple way to do this is to treat the linking subscript as a two-feature complex, consisting of the privative features *A* and *o*. This predicts a four-way split in argument realizations, which is actually found in the following set of verbs of transfer (I have not yet investigated how widespread it is):

(12) a. Bill gave Harry *(the book). Theme subscripted *Ao*: obligatory argument
     b. Bill served Harry (the food). Theme subscripted *A*: optional argument
     c. Bill provided Harry *(with a book). Theme subscripted *o*: obligatory oblique
     d. Bill supplied Harry (with a book). Theme unsubscripted: optional oblique

With this mechanism, the choice between syntactic arguments that are optional or obligatory and structurally or semantically case-marked is a lexical property specified by the linking subscript. Nothing need be specified in terms of syntactic subcategorization.

3.3. Categorial realization of arguments. We saw a moment ago that semantic selection can account for the *conceptual* category of an argument. Is this sufficient to account for its *syntactic* category? (13) gives the possible syntactic realizations of some of the conceptual categories; I have underlined the unmarked case, or *canonical structural realization* (CSR) (following Grimshaw's (1979) terminology).

(13) a. Thing can be realized (only) as *NP*

b. Path can be realized as *PP* (*to the house*)
or NP (*that way*)

c. Property can be realized as *AP* (*red*)
or NP (*a bummer/a gas*)
or PP (*out of luck*)

d. Event can be realized as *CP*
or NP (*the earthquake*)

e. Proposition can be realized as *CP*
or IP (ECM infinitive)
or NP (*that fact*)

So far, the linking subscript determines only whether a conceptual argument is to be syntactically realized; it does not restrict the syntactic category of its realization. For a large variety of cases this appears correct.

(14) a. Path:
Bill ran to the house (PP)/that way (NP).
b. Property:
The Magic Flute is wonderful (AP)/a gas (NP)/out of sight (PP).
c. Proposition:
Bill believes that Fred left (CP)/Fred to have left (IP)/ something incredible (NP).

However, other verbs are not so free in their choice of syntactic arguments.

(15) a. Path:
Bill reached through the window (PP)/??that way (NP) (in non-manner reading of *that way*)
b. Property:
Fred looks awful (AP)/*a bummer (NP)/??out of sight (PP).
Harry slowly got crazy (AP)/*out of his mind (PP).
c. Proposition:
Bill said that Fred left (CP)/*Fred to have left (IP)/ something incredible (NP).
Bill expressed *that Fred had left (CP)/*Fred to have left (IP)/the fact that Fred had left (NP).

This suggests that there still must be a mechanism for syntactic categorial selection; it applies just when the categories possible are a subset of the realizations of the A-marked conceptual argument. This mechanism cannot be subsumed under structural case-marking (as suggested by Pesetsky 1982), since among the choices are PP vs. AP (neither of which is case-marked) and CP vs. IP vs. NP (where ECM does not always co-occur with the possibility of NP complements).

I conclude therefore (1) that semantic selection can account for semantic restrictions on syntactic arguments, including conceptual category; (2) that linking determines (a) the maximum number of arguments, (b) whether they are obligatory or optional, and (c) whether they are "direct" or oblique; and (3) that there is a residue of syntactic selection that can further restrict the syntactic category of arguments.

In short, the hypothesis that *all* syntactic selection can be eliminated is incorrect, though there is certainly a great deal less of it than in Chomsky 1965. Returning to the main point of the present paper, we may observe that this detailed factoring of the selection mechanism is possible only because of the existence of a formalization for conceptual structure in which all the relevant semantic factors are explicit.

4. Syntactic arguments with multiple θ-roles

Let us now go back to the example of *sell*, two of whose syntactic arguments have multiple θ-roles. How is the LCS of *sell* formulated? Suppose all the positions in which BOOK, JOHN, and BILL appear in (1b) are A-marked, as in (16). ((16) as given violates the Linking Principle above, in that its Source is realized in subject position. That's because in the interests of simplicity I haven't given you the entire conceptual structure of *sell*; see Jackendoff 1990, chapter 9 for a more adequate account.)

$$(16)\ \left[\begin{array}{l} \qquad \mathrm{GO_{Poss}}\ ([_{\mathrm{Thing}}\ ]_{\mathrm{Ao}},\ \left[\begin{array}{l} \qquad \mathrm{FROM}\ [_{\mathrm{Thing}}\ ]_{\mathrm{Ao}} \\ {}_{\mathrm{Path}}\ \mathrm{TO}\ [_{\mathrm{Thing}}\ ]_{\mathrm{A}} \end{array}\right]) \\ {}_{\mathrm{Event}}\ [\mathrm{EXCH}\ [_{\mathrm{Event}}\ \mathrm{GO_{Poss}}\ ([_{\mathrm{Thing}}\ \mathrm{MONEY}],\left[\begin{array}{l} \qquad \mathrm{FROM}\ [_{\mathrm{Thing}}\ ]_{\mathrm{A}} \\ {}_{\mathrm{Path}}\ \mathrm{TO}\ [_{\mathrm{Thing}}\ ]_{\mathrm{Ao}} \end{array}\right])]] \end{array}\right]$$

One trouble with (16) is that it seems to require not three but five arguments in syntax. In addition, it does not tell us that the two arguments in the EXCH Event are the same as two in the main Event.

This property of "sameness" turns out not to have anything to do with whether the argument is syntactically realized or not. Consider the passive *A book was sold to Bill*. Here, even though the seller is not syntactically expressed, we know that the person who gave the book to Bill is the same person as got the money from Bill. Similarly, in *Bill sold a book*, the optional argument is not expressed in syntax—but we still know that the person who Bill gave the book to also gave money to Bill. Thus we need a means internal to conceptual structure to encode the fact that a particular character has multiple roles—whether or not that character is mentioned in the syntax.

The mechanism developed in Jackendoff 1990 is *conceptual structure binding* (or *cs-binding*). This is a connection between a binding constituent (or binder) and a bound constituent (or bindee) which indicates that they are necessary the same character. Using this notation, the LCS for *sell* can be expressed as (17).

$$(17)\ \left[\begin{array}{l} \qquad \mathrm{GO_{Poss}}\ ([_{\mathrm{Thing}}\ ]_{\mathrm{Ao}},\ \left[\begin{array}{l} \qquad \mathrm{FROM}\ [_{\mathrm{Thing}}\ ]^{\alpha}_{\mathrm{Ao}} \\ {}_{\mathrm{Path}}\ \mathrm{TO}\ [_{\mathrm{Thing}}\ ]^{\beta}_{\mathrm{A}} \end{array}\right]) \\ {}_{\mathrm{Event}}\ [\mathrm{EXCH}\ [_{\mathrm{Event}}\ \mathrm{GO_{Poss}}\ ([_{\mathrm{Thing}}\ \mathrm{MONEY}],\left[\begin{array}{l} \qquad \mathrm{FROM}\ [_{\mathrm{Thing}}\ \beta] \\ {}_{\mathrm{Path}}\ \mathrm{TO}\ [_{\mathrm{Thing}}\ \alpha] \end{array}\right])]] \end{array}\right]$$

The Greek superscripts indicate cs-binding constituents; the Greek letters within brackets indicate bound constituents. Thus (17) says that the Source of the main Event and the Goal of the subordinate Event are necessarily the same character, and similarly for the Goal of the main Event and the Source of the subordinate Event. At the same time, the number of A-marked constituents has been properly reduced to three; the extra θ-roles come in through cs-binding, not through extra A-marking. If, because of the passive, one of the explicit arguments disappears from the syntax, the cs-binding relation still obtains between the two argument positions in conceptual structure; both θ-roles just become implicit. Similarly, if the optional argument is not expressed, the cs-binding relation still holds.

As a result of this move, the Neo-θ-criterion can be restated more precisely, in a way that follows automatically from the mechanisms of linking and binding:

Correspondence principle (Neo-θ-criterion) Each syntactic argument is linked to exactly one thematic role, which may in turn cs-bind others, giving the syntactic argument (in effect) multiple θ-roles.

5. Syntactic binding

Next consider intransitive *dress*. We want to say that its subject has two θ-roles, the Agent and the Theme (the person who is put into clothes). This can be expressed with the LCS in (18).

(18) $[_{\text{Event}}\ \text{CAUSE}\ ([_{\text{Thing}}\ ]^{\alpha}_{\text{Ao}}, [_{\text{Event}}\ \text{GO}\ ([\alpha], [\text{TO}\ [\text{IN}\ [\text{CLOTHES}]]])])]$

This has only one A-marked constituent, the Agent, which thereby is linked to the subject. However, because of the lexical cs-binding, the subject is understood as both Agent and Theme. Now look at transitive *dress*, which has (19) as its LCS.

(19) $[_{\text{Event}}\ \text{CAUSE}\ ([_{\text{Thing}}\ ]_{\text{Ao}}, [_{\text{Event}}\ \text{GO}\ ([_{\text{Thing}}\ ]_{\text{Ao}}, [\text{TO}\ [\text{IN}\ [\text{CLOTHES}]]])])]$

Conceptually this is exactly the same; only the linking is different, in that the Theme is independently A-marked and thus realized as a direct object.

Let's see what happens when the object of *dress* is reflexive. According to standard syntactic theory, the reflexive comes to be bound to the subject, where binding is encoded as coindexing of syntactic constituents:

(20) Bill_i dressed himself_i.

What is the conceptual structure associated with (20)? In particular, what conceptual structure counterpart ought to be assigned to the coindexation in (20)? Brief reflection suggests that the relation we want is expressed precisely by cs-binding: the point of bound anaphors is that they necessarily denote the same character as their antecedents. Thus the requisite conceptual structure is (21).

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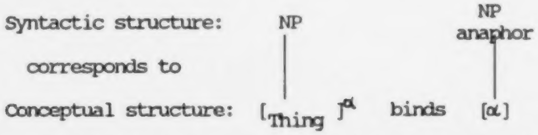
(21)
$[_{\text{Event}}\ \text{CAUSE}\ ([_{\text{Thing}}\ \text{BILL}]^{\alpha},\ [_{\text{Event}}\ \text{GO}\ ([\alpha],\ [\text{TO}\ [\text{IN}\ [\text{CLOTHES}]]])])]$

But this is exactly the conceptual structure for Bill dressed. In other words, the conceptual structure of the reflexive is a bound variable (with the feature MALE), and its binder is the constituent to which it is coindexed in the syntax.

However, we now apparently have two mechanisms with the same purpose: both syntactic coindexation and cs-binding indicate necessary coreference. Economy suggests we try to eliminate one of them. Unfortunately for tradition, we cannot eliminate cs-binding. As we just saw, it is motivated by the need to encode multiple θ-roles for a single syntactic argument, and even multiple θ-roles for implicit arguments. Hence it cannot be reduced to a relation between distinct syntactic constituents. On the other hand, it is possible to eliminate the traditional syntactic binding notation in (22a), by regarding it as an abbreviation for the relation shown in (22b).

(22) a. NP_i binds $\begin{bmatrix}\text{NP}\\ \text{anaphor}\end{bmatrix}_i$

b.



That is, syntactic binding can be regarded as the special case of cs-binding where the binder and bindee are both syntactically explicit. A reflexive can then be thought of as a syntactic constituent whose LCS is in effect "bind me" -- it is a bound variable whose binder must be located. The syntactic conditions on binding can then be regarded as conditions for locating the syntactic constituent whose conceptual structure serves as binder for the variable.

Why should this matter to syntactic theory? In principle, one could just go on doing binding theory as before, simply understanding the traditional notation (22a) as an abbreviation for the more articulated (22b). Jackendoff 1990 shows how this treatment can be used to account for various phenomena of obligatory control, semantically governed control, control by implicit arguments (where there is a cs-binder that lacks syntactic realization), and predication. However, now I would like to present some evidence adapted from Fauconnier 1984 that challenges the traditional view of binding more deeply.

6. Interaction of binding with so-called pragmatic rules

Suppose you and I go down to the wax museum and I am guiding you through the wax statues. I may say,

(23) Look! Here's W. C. Fields, and here's Mae West, and, wow, over here are the Beatles: This one's John, and this one's Ringo.

We see from (23) that there is a principle of language use that can be stated very informally as the "Statue Rule" (24).

(24) (Statue Rule) It is legitimate to identify a statue by using the name of the person the statue portrays.

What kind of principle is the Statue Rule, that is, in which component of knowledge of language should it (or a suitable generalization of it) belong? There are at least three possibilities.

Option A. It is a general rule of pragmatics that involves knowledge of the world, and therefore doesn't have anything to do with knowledge of language per se.

Option B. It is a rule of syntax that licenses deletion of the head noun in such phrases as statue of X, portrait of X, and photograph of X.

Option C. It is a rule of interpretation that licenses optionally matching a syntactic structure X with a conceptual structure more fully expressed as 'visual portrayal of X.'

I suspect the impulse of many syntacticians will be to favor option A; sentences like (23) don't seem to bear on anything normally considered syntactic. But closer attention shows that this cannot be correct.

Consider a slightly more elaborate scenario: The other day I was strolling through the wax museum with Ringo Starr, and we came upon the statues of the Beatles.

(25) All of a sudden I accidentally stumbled and fell on Ringo.

(25) is ambiguous: I may have fallen on either the actual guy or his statue. For ease of exposition, let me use the notation <plain> Ringo to stand for 'the phrase Ringo used in reference to the actual person' and <statue of> Ringo to stand for 'the phrase Ringo used in reference to a/the statue of the person.' The latter is the case in which the Statue Rule is operative. Then the ambiguity of (25) turns on whether its last phrase is <plain> Ringo or <statue of> Ringo.

Next, the same scenario, but

(26) All of a sudden Ringo started undressing himself.

(26) too is ambiguous: he could be taking off his own clothes or those of the statue.

Now consider (27).

(27) ?All of sudden Ringo stumbled and fell on himself.

This is not quite as good as (26), but it clearly means that the real guy falls on the statue.

Next, still under the same scenario,

(28) All of a sudden I accidentally bumped into the statues, and *Ringo toppled over and fell on himself.

Pragmatically, the only possible interpretation of (28) is that the statue falls on the guy — but, surprisingly, this reading is impossible. What's going on?

Stripping away all the *mise en scène*, the problem is that sentence (29) is (pretty) good when the subject is *<plain> Ringo* and the object is *<statue of> himself*, a reading paraphrased by (29a). But (29) is unacceptable when the subject is *<statue of> Ringo* and the object is *<plain> himself*, as paraphrased in (29b).

(29) Ringo fell on himself.
  a. 'The actual Ringo fell on the statue of Ringo.'
  b. *'The statue of Ringo fell on the actual Ringo.'

The problem seems to have something to do with the binding of the reflexive. In particular, the grammaticality of the interpretations of (29) parallels exactly the grammaticality of the paraphrases in (30).

(30) a. Ringo fell on the statue of himself.
  b. *A statue of Ringo fell on himself.

If this is the case, then it follows that *readings (29a) and (29b) must be structurally differentiated at the level at which binding applies.* What are the consequences? First, this shows that the Statue Rule cannot just be a convention of language use or pragmatics, invisible to rules of grammar. That is, Option A cannot be correct. Second, traditional binding theory might respond that <plain> *Ringo* and <statue of> *Ringo* must differentiated syntactically, so that different binding possibilities can apply. However, finding a relevant syntactic difference proves to be rather difficult. Jackendoff 1992 shows that it is impossible to work out the details of such a syntactic difference: with respect to all phenomena other than binding, for instance case marking, number agreement, and pronominal agreement, <statue of> *Ringo* behaves exactly the same as <plain> *Ringo*. Thus Option B cannot be correct; nor is any variant of Option B that posits a syntactic difference between the two interpretations, for instance an empty head for the "statue" reading that is filled by head-to-head movement of *Ringo*.

This leaves Option C, in which readings (29a) and (29b) are identical in syntax but different in conceptual structure. The idea is that *<statue of> X* has a function in its conceptual structure that *<plain> X* lacks, so that *<statue of> Ringo* has conceptual structure [STATUE ([RINGO])]. Then (29a,b) come out like this:

(31) a. (29a) = [GO ([RINGO]$^{\alpha}$, [TO [ON [STATUE ([α])]]])]
  b. (29b) = [GO ([STATUE ([RINGO]$^{\alpha}$)], [TO [ON [α]]])]

Here the reflexive is notated as above, as a variable bound to *[RINGO]*. The difference between the two readings is in where the function STATUE is added.

Given this difference, it is possible to state a structural well-formedness condition on cs-binding that makes (31a) well-formed and (31b) ill-formed. I won't go into the details of such a condition here (see Jackendoff 1992), but the basic idea is that that binder in

(31b) is embedded inside an argument, while the bindee is itself an argument; this configuration in general turns out to be ill-formed, whatever the syntactic structure associated with it.

Now notice that (31a) and (31b) are also the conceptual structures for (30a) and (30b) respectively. In (30), the function STATUE is overtly expressed in the syntax by the noun statue, and the embedding of the argument of the conceptual function statue is directly reflected in the syntax. But now we are again confronted with a duplication in the theory. Traditionally, the difference in grammaticality between (30a) and (30b) has been a matter of syntactic c-command, a part of Principle A of the binding theory. Yet now we are positing a condition on cs-binding that makes exactly the same distinction in grammaticality. Theoretical economy demands that, in the absence of evidence to the contrary, we should not have two devices in the grammar with exactly the same effect. Which should be eliminated?

Again, regretfully for tradition, we cannot eliminate the well-formedness condition on cs-binding and keep syntactic c-command as the proper condition. The reason is that there is no syntactic difference between readings (29a) and (29b) to which syntactic c-command can refer. Thus this evidence suggests that at least some of the traditional conditions are binding are fundamentally misconstrued: they are not conditions on syntax, but rather conditions on conceptual structure.

I suspect that such a conclusion will strike many readers as madness. Why consider discarding long-established analyses and starting over? I submit, however, that the present situation is an artifact of history. The development of binding theory began at a time when there was no articulated notion of conceptual structure to work with, so there was no possibility of developing a formally acceptable mixed theory of binding. In addition, the early days of binding theory followed close on the heels of the discrediting of generative semantics, when anything that smacked of a mixture of syntax and semantics was ideologically suspect. Those times are gone, and we ought now to be willing to consider mixed alternatives when the facts push us that way.

This is not the place to develop detailed proposals on how binding theory should be reconfigured -- that will certainly be a major enterprise. However, I have tried to suggest at least that binding theory should be reconfigured, in a major break with tradition. Again, such a hypothesis could not be developed in the absence of an articulated theory of conceptual structure, where one can be fairly precise about structural configurations and lexical decomposition.

7. Conclusion

More generally, as we go more and more deeply into the analysis of conceptual structure, we find that it bears increasingly on problems that have traditionally been regarded as syntactic, because there was no other precise way to regard them. As a result of the conceptual analysis, the expressive power necessary in syntax can be reduced.

One might respond that the price is a corresponding complication in conceptual structure. However, in many cases, the conceptual complications are independently necessary just to express what the sentence means. We have seen instances here in the treatments of arguments with multiple θ-roles, of implicit arguments, and of cs-binding. Hence the tradeoff is actually not between conceptual complexity and syntactic complexity, but rather between conceptual complexity and syntactic plus conceptual complexity. The choice ought to be obvious. Within this framework, then, the difficult problem for research is to factor the phenomenon in question into its syntactic and conceptual parts.

Overall, of course, research should be driven by the first principle of grammatical theory -- to make the language learner's life easier. But this principle does not pertain to syntax alone or to conceptual structure alone; it pertains to the whole system. I think I have shown that, in seeking to develop a syntactic theory that makes language learning possible, one cannot any more ignore the contribution of conceptual structure.

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ESCOL '91 160-173

META-TEMPLATES & THE UNDERLYING (DIS-)UNITY OF SANSKRIT REDUPLICATION

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0. Introduction.

As part of the special attraction which Sanskrit has long held for Western linguists, one aspect of the grammar of this language that has received more than its fair share of mention in the literature, even in studies ostensibly devoted to such topics as the morphophonology of aspiration alternations, has to do with reduplication in the verb system (for relevant bibliography, see Janda & Joseph 1989). In two recent studies (Janda & Joseph 1986 and Joseph & Janda 1988), we have ourselves analyzed Sanskrit verbal reduplication from the perspective of the general framework known as "Process Morphology", an approach whose adherents literally range from A to Z (cf., inter alia, Anderson 1977, Aronoff 1976, Bach 1983, Dowty 1978, Hoeksema 1984, Janda 1983b, Matthews 1965, Schmerling 1983, Thomas-Flinders (ed.) 1981, and Zwicky 1985, to cite just a small sample of authors and their early work). In Process Morphology, non-root "morphemes" are not treated as things--e.g., as lexical entries or material added by rules--but instead are themselves rules--i.e., processes--triggered primarily by the morpho-syntactico-semantic features which they express. As a result, many morphological operations appear to require the power of the transformational rule-format: especially permutations (metatheses), but also some infixations and complex affixations. This viewpoint contrasts sharply with the alternative framework usually known as "Prosodic Morphology"--which, since its beginnings in, e.g., McCarthy 1979 and Marantz 1982, has continued to expand and develop via such major reorientations as that of McCarthy & Prince 1986-MS and later works. In Prosodic Morphology, no morphemes are processes--i.e., morphological rules; rather, all morphemes are indeed things--e.g., lexical entries--although they often consist solely of templates that involve only a minimal amount of phonological content. On this approach, the transformational rule-format can apparently be dispensed with completely, and so it seems that morphological theory can be highly constrained. Even infixations and complex affixations, for instance, can be analyzed entirely in terms of templates and largely universal autosegmental association-conventions applying to individual tiers, with all processes which appear to have morphological triggers being treated as "morphologically conditioned phonological rules".

In our three previously-cited joint papers (hereafter J&J '86, '88, '89), we examined reduplicative verb-morphology in Sanskrit with an eye to comparing the two abovementioned approaches—especially because, ever since Marantz 1982, reduplication has generally been held to represent the paradigm case where Prosodic Morphology can be shown to be much more constrained than Process Morphology. In those works, we argued that Prosodic Morphology cannot insightfully express the mixture of formal similarity and diversity exhibited by the various reduplications in Sanskrit, claiming that this situation receives a homogeneous treatment only in a uniformly rule-based approach like Process Morphology. In particular, since individual idiosyncrasies in the realizations of reduplication across the different verbal categories of Sanskrit require that these reduplications be stated separately, some mechanism is needed for expressing the significant commonalities which they also share. J&J '86, '88, '89 therefore proposed (following Janda 1982b) a novel device which not only expresses--as generalizations--these formal similarities across distinct morphological rules but also groups together such sets of processes into larger ensembles. In this way, for example, we can posit a "meta-redundancy-rule" (or "redundancy meta-rule")--i.e., a redundancy statement defined over rules--which unifies the multitudinous Sanskrit reduplications as a "rule constellation": a set of rules which are united by one or more shared properties of form but which cannot be collapsed with one another due to one or more incompatible differences of form and/or function.

Still, at least in J&J '86, '88, the main goal which we pursued was not that of attempting to demonstrate the efficacy of a Process Morphology account of Sanskrit reduplication vis-à-vis analyses in other frameworks. Rather, those two earlier studies primarily sought to promote a particular solution--one making use of rule constellations and meta-redundancy-rules--as the best way to capture non-collapsible formal similarities across distinct morphological elements. Nevertheless, the specific approach which we adopted also required that reduplication be analyzed as a set of morphological rules, thereby allowing rule constellations and meta-redundancy-rules to be invoked as a means of capturing the relevant cross-rule similarities. We have since realized, however, that the continued dominance in contemporary morphology of non-processual approaches, especially Prosodic Morphology, has had the result that processually expressed notions like rule constellations and meta-redundancy-rules (especially the latter) have not received the attention we feel they deserve, even though they can quite easily be translated into prosodic analogues.

In order, therefore, that the baby not be thrown out with the bathwater--i.e., that the concept of meta-redundancy-rules not be tarred with the same brush as rule constellations and Process Morphology--we will in Section 3 below set aside the latter and adopt, as an alternative avatar of our constellational analysis for Sanskrit reduplication, a templatic, prosodic framework. It is thus our primary goal in this paper to show that a minimal extension of Prosodic Morphology so as to include the already conceptually implied (and tacitly employed) notion of "meta-template" permits an insightful analysis of the several Sanskrit reduplications in a way which expresses the same generalizations as do rule constellations and meta-redundancy-rules, but without requiring the recognition of any morphological processes.* The present study therefore does not constitute counterevidence to Process Morphology (although the loss of a claimed advantage over Prosodic Morphology could be considered a lessening of "pro-evidence"). Rather, the issue of capturing non-collapsible formal similarities across distinct morphological elements transcends the process/prosody debate, since it demands as well as receives a solution in both approaches.

1. An Initial Comparison of Prosodic and Processual Morphology--vis-à-vis German Umlaut.

Ever since the appearance of McCarthy 1979, the primary appeal of Prosodic Morphology has been its ability to achieve processual surface-effects (like apparent metathesis) without recourse to processual stipulations. In this regard, it is the central, representational notion "prosodic template" which, in conjunction with association conventions that are to a high degree independently motivated and even universal, allows Prosodic Morphology to impose such strong restrictions on language-particular morphological rules. The prosodic achievement is consequently that, with the development of an increasingly refined set of association conventions (e.g., now also from the "edge in"; cf. Yip 1988), morphological rules involving both inputs and outputs can basically be dispensed with in favor of a straightforward set of templates constraining output form alone.

Process Morphologists' responses to Prosodic Morphology have therefore centered on attempts to show that, in certain instances, an exclusively templatic analysis, unsupplemented by rules, is insufficient to express certain obvious morphological generalizations. On the one hand, many defenses of Process Morphology focus on such prima-facie processual phenomena as metathesis and exchange-rules (cf., e.g., Janda 1983b, 1984, 1987:27-47, 298-407). The argumentation reconsidered here, however, involves the suggestion that, in their rule-centeredness, analyses expressed in terms of processes and (meta-)redundancy-rules are inherently more unified than prosodic treatments which combine templatic and other lexical entries with redundancy rules.

One earlier claim regarding an apparent instance of this sort focused on the different subgeneralizations which must be recognized within the general process of Modern High German [NHG] umlaut (cf. Janda 1982a, 1982b, 1982c-MS, 1983a)--a set of phenomena later discussed by J&J '86, '88 as constituting perhaps the world's largest rule-constellation, with more than sixty members. In particular, this extremely diverse nature of umlaut in contemporary German exists because a single purely phonological rule of Pre-Old High German--in origin probably a completely allophonic process formulable in segmental terms roughly as V --> [-back] /__ C_0 [-consonant, -back, +high]--has been transformed, through a series of steps leading to further phonologization and then to morphologization and fragmentation, into a repeated part of numerous morphological rules in NHG. This recurrent formal pattern, which can be factored out of the myriad NHG inflectional and derivational rules that involve (i) umlaut alone (occasionally), (ii) umlaut with prefixation (somewhat less frequently), or (iii) umlaut with suffixation (by far most commonly), can be expressed approximately as /...V.../ --> /...[V, -back, -low].../.[1]

Some idea of the wide range of NHG categories which are wholly or partially marked by umlaut can be gained from the small sample which follows. In this listing (which in subpart (iii) is structured according to an alphabetical order based on the initial letter of representative suffixes that accompany umlaut), each entry has the format _basic form / derived form_, 'gloss for basic form' / 'gloss for derived form'. In order to maximize comparability, all of the roots involved have short /a/ (orthographic <_a_>) as their underlying vowel, with short / ɛ/ (orthographic <_ä_>) as their umlauted counterpart. Thus, (i) two examples of umlaut alone are _Hammer/Hämmer_ 'hammer'/'hammers' and _hart/härt-(en)_ 'hard'/'(to) harden'; (ii) one illustration of umlaut with prefixation is _Ast/ Ge-äst_ 'branch'/'group of branches', and (iii) eighteen examples of umlaut with suffixation are _Lamm/Lämm-chen_ 'lamb'/'lambkin', _Ball/Bäll-e_ 'ball'/'balls', _Arm/Ärm-el_ 'arm'/'sleeve', _Hanf/ hänf-en_ 'hemp'/'hempen', _Dach/Däch-er_ 'roof'/'roofs', _Gans/Gäns-er(-)ich_ 'goose'/'gander', _Wachs/ wächs-er(-)n_ 'wax'/'waxen', (archaic) _Tann(-)e/Tänn-icht_ 'fir-tree'/'fir-thicket', _Macht/mächt-ig_ 'might'/'mighty', _Arzt/Ärzt-in_ 'physician (male/female)', _Stadt/städt-isch_ 'city'/'urban', _Abt/Äbt-iss(-)in_ 'abbot'/'abbess', _Bach/Bäch-lein_ 'brook'/'brooklet', _Mann/männ-lich_ 'man'/'masculine', _schwach/Schwäch-ling_ 'weak'/'weakling', _Ver-stand/Ver-ständ-nis_ 'intellect'/'understanding', _arm/ ärm-st(-)_ 'poor'/'poorest', and _fall-(en)/fäll-t_ '(to) fall'/'((s)he/it) falls'.

These and similar forms provide several kinds evidence for the fragmentary nature of NHG umlaut. First, they display variable productivity. Thus, for example, diminutive formation using the suffix _-lein_ is accompanied by umlaut for all roots (e.g., _Mutter_ 'mother', hence _Mütter-lein/_ *_Mutter-lein_ 'little mother, mommy'), but diminutive formation using the suffix _-chen_ is at most optionally accompanied by umlaut for some roots (cf. _Mütter-chen/Mutt(er)-chen_ 'little mother, mommy') and never cooccurs with umlaut for other roots (like _Tant(-)e_ 'aunt', hence *_Tänt-chen/ Tant-chen_ 'auntie'), although most roots do obligatorily show umlaut with _-chen_ (e.g., _Hand_ 'hand', hence _Händ-chen/_*_Hand-chen_ 'little hand') . Similarly, some formations with umlaut are virtually or totally unproductive isolates, such as (respectively) _Tänn-icht_ and _Äbt-iss(-)in_ above, as opposed to the more or less completely productive formations possible with suffixes like _-in_ and _-lein_ (cf., e.g., _Lands-mann/Lands-männ-in_ 'compatriot (male/female)').

Second, though, forms like those listed above often show variability of umlaut even with regard to the same root and/or the same suffix. Thus, consider the following groupings, given in the format _singular / plural / -ig-derived adjective_, 'singular gloss' / 'plural gloss' / 'adjectival gloss'. The consistent lack of umlaut in _Arm/Arm-e/...-arm-ig_ 'arm'/'arms'/'...-armed' is unusual, and the consistent presence of umlaut in _Bart/Bärt-e/bärt-ig_ 'beard'/'beards'/'bearded' is quite common, but the asymmetrical inconsistency of umlaut in _Tag/Tag-e/...-täg-ig_ 'day'/'days'/'lasting ... days' vs. _Busch/Büsch-e/busch-ig_ 'bush'/'bushes'/'bushy' is also not uncommon. Perhaps most telling are examples like _Sach(-)e_ 'thing' vs. _säch-lich_ 'neuter' vs. _sach-lich_ 'objective', where even the same root + suffix combination has a pattern of umlaut-presence vs. absence which is arbitrarily correlated with a semantic distinction (on these and similar facts viewed from a quite different perspective, cf. also the pioneering account in Wurzel 1970).

Third, finally, and most importantly, umlaut has different structural descriptions in different morphological categories. For instance, certain morphosyntactic contexts do not allow umlaut with the root-vowel /au/ or in polysyllabic roots, while other contexts do, even for the same root. This is the case, for instance, with the comparative and superlative of adjectives. That umlaut of a root vowel can accompany suffixation with _-er_ 'comparative' and _-(e)st(-)_ 'superlative' is demonstrated by word sets like abovementioned _arm/ärm-st(-)_ 'poor'/'poorest' (cf. also _ärm-er_ 'poorer'). In similar fashion, the fact that adjective-roots which are polysyllabic and/or whose vowel is /au/ can in principle undergo umlaut is shown by examples like, respectively, _lauter/läuter(-n)_ 'pure'/'purify' and _braun/Bräun-e_ 'brown'/'brownness, tan'. Nevertheless, it is simply the case that no polysyllabic or /au/-ful adjective-roots ever undergo umlaut in the comparative or the superlative: cf., e.g., *_läut(e)r-er/laut(e)r-er_ 'purer' and *_läuter-st(-)/lauter-st(-)_ 'purest', as well as*_bräun-er/braun-er_ 'browner' and *_bräun-st(-)/braun-st(-)_ 'brownest'. A parallel polysyllabic adjective whose frontable vowel is not /au/ is _munter_ 'cheerful'; that its short /U/ is in principle umlautable is shown by abovementioned _Mutter/Mütter-lein_ 'mother'/'little mother, mommy', but we find comparative *_münt(e)r-er/munt(e)r-er_ 'more cheerful' and superlative *_münter-st(-)/munter-st(-)_ 'most cheerful'.[2]

As a result, it indeed appears that there are at the very least two distinct morphological processes involving umlaut in NHG, and most probably more than sixty. To repeat, some of these umlauts are the sole marker of a morphological category (like 'plural' in abovementioned _Hammer/ Hämmer_ 'hammer'/'hammers'), but most of them cooccur with processes of prefixation or suffixa-

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tion (or both, as in *lach(-en)/Ge-lăch-ter* '(to) laugh'/'laughter'). And, in order to express the common vowel-fronting aspect of these umlaut-related rules, it seems clear that there is a need for a meta-redundancy-rule like the one suggested above.

However, a potentially quite serious obstacle must be confronted by anyone who proposes to cite NHG umlaut as perhaps the largest and hence the best example of a morphological rule-constellation--and thus as a problem which Prosodic Morphology, because of its inherently non-processual nature, apparently cannot avoid. This obstacle has to do with the fact that, while the various NHG umlaut-processess are differentiated by a wide range of factors including disparate productivity, cross-cutting lexical idiosyncrasies, and distinct structural descriptions, they all still have (at least in the contemporary standard language) exactly the same structural change. As a consequence of their being so similar (if not identical) in this way, though, the proposal that there are sixty-some NHG umlauts which largely cooccur with other morphological rules is sure to provoke the same response of nearly automatic rejection that Kiparsky 1982:38-39 expresses concerning the parallel possibility of recognizing a constellation of English Trisyllabic Shortening processes vis-à-vis the affixes with which that rule generally occurs: "...[In a]n ... approach ... deny[ing] the phonological character of rules such as TrisyllabicShortening...[, i]t is commonly said that rules of this type are to be considered 'morphological' or 'morphologized'. This claim may actually mean a number of things, since there are several possible ways of treating morphologically conditioned rules in the phonology. But on any of the possible construals, the properties of the rule seem to be obscured rather than explained by the proposal. ...[One] version is that morphophonemic processes are integral parts of morphological operations. This is the most unfortunate treatment of all because it denies that there is a single process involved, and claims that there are as many 'Trisyllabic Shortening' Rules as there are suffixes that can trigger the shortening process. Since the shortening is stated separately in connection with each affixation process, there is no way in this theory to distinguish between English and a hypothetical language in which each suffix triggers its own arbitrary set of changes in the stem."

Of course, one can immediately attempt to overcome Kiparsky's objections by pointing out that it is precisely the nature and purpose of meta-redundancy-rules to unify a large set of, e.g., English Trisyllabic Shortenings or NHG umlaut-processes as individual instantiations of a single generalization. Nevertheless, the vehemence with which Kiparsky rejects a constellational analysis for English makes it clear that the various umlauts of NHG are so similar (if not identical) in form with respect to one another that they probably do not provide the optimal motivation for meta-redundancy-rules--whereas the Sanskrit reduplications, to which we now turn, show much more formal divergence and thus constitute a far better test-case.

2. The Prosodically Problematic Character of Sanskrit Reduplication.

The morphosyntactic categories marked by reduplication in Sanskrit are nominal as well as verbal. Examples of nominal reduplication include, e.g., emphatic *vayáṃ-vayam* 'we ourselves', with repetition of an entire word (but retention of only one accent), and ádverb-like *rathaa-rathi* 'chariot against chariot' (cf. *ratha-* 'chariot'), with repetition of parts of a word, although some aspects of the overall vocalism are fixed (here, specifically, the *-aa...i*). The verbal reduplications encompass the three tense-stems--present, perfect, and aorist--and two so-called "secondary" (roughly, derivational) conjugations: the intensive and the desiderative. At least for verbs (the only word-class in the language for which reduplication has been discussed in the generative literature), Sanskrit reduplication has been treated as if it were a unitary phenomenon, involving a single templatic prefix CV-, by virtually all Prosodic Morphological analyses other than Steriade 1988. These analyses concede at most that there is some variation in which vowel (if any) is prelinked to the prefixal template: cf., e.g., *ta-tap-* , the more unmarked vowel-copying perfect-stem of √*tap-* 'heat', vs. *vi-vak-*, the more marked vowel-prespecifying present-stem of √*vac* 'speak'. As emphasized by both J&J '86, '88 and Steriade 1988, though, Sanskrit reduplication shows numerous further differences both across and within the five relevant verbal categories. We begin our discussion here by providing a brief overview of the facts (see J&J '86, '88 and Whitney 1885a, 1885b for more details) and some initial consideration of how they would be dealt with in a templatic approach.

Given that there can be prelinking of one or more parts in the templatic affix(es) for Sanskrit reduplication, there are possiblilities for considerable variation in the form(s) that this prespecification actually takes in particular cases. First, for consonants, there are specific differences (i) in the presence vs. absence of palatalization for the initial templatic C-slot corresponding to a root-initial velar consonant and (ii) in the presence vs. absence of aspiration for the initial templatic C-slot corresponding to a root-initial aspirated consonant. For instance, the root √*ghraa*- 'smell' forms a reduplicated present-stem *ji-ghraa*- whose reduplicative prefix begins with /gh/, thus showing the usual pattern of both palatalization and deaspiration--which here yields *j*-. But the root √*han*- 'smite' (which in some categories shows the variant root-form *ghan*-) has a reduplicated intensive-stem *ghanii-ghan*-, where /gh/ reduplicates as *gh*- and is thus neither palatalized nor deaspirated. Admittedly, such non-palatalized and/or aspirated reduplicated consonants in verbs[3] are found only in Vedic, the oldest stage of the language, and there only in intensive stems. Still, even though they do not occur in great numbers, such non-prespecified consonants are nevertheless well-enough repesented (cf., e.g., the seven instances given in Whitney 1885b) that they must be considered a Vedic subtype within the general pattern for intensive formation. Thus, in the default case, the templatic prespecification for Sanskrit verbal reduplication may be such that the first C-slot in the reduplicative prefix is [-spread glottis, -back], but, in Vedic intensives, this C-slot may be [+spread glottis] and/or [+back].

Second, there are differences in the vocalic feature-prespecifications of Sanskrit reduplicative templates. In particular, there is no constant vowel-quality or vowel-length across all the many types of reduplication; instead, each category which is realized via reduplication has one unmarked value (and a variety of marked values) for the length and quality of the syllable rhyme in the reduplication syllable. Thus, for example, prespecified short /i/ is normal in the desiderative and the present; prespecified long /ii/ is unmarked in the aorist; an unprespecified copy of the root-vowel is expected in the perfect, and a heavy reduplication-syllable is usual in intensives.

Third, quite beyond the matter of prespecification, the various Sanskrit reduplications additionally show substantial differences in the form of the templatic affix itself. The shapes CV-, CVV-, and CVCVV- can be respectively illustrated with the abovementioned present-stem *vi-vak*- (from the root √*vac*- 'speak') and the two intensive-stems *saa-smṛ*- (from the root √*smṛ*- 'remember') and *ghanii-ghan*- (from the root √*han*-/√*ghan*- 'smite'). But there also exist templates having the form CVC-, CVCV-, VC-, VVC-, V-, or even VV-, as respectively in the intensive stems *bad-badh*- (from the root √*baadh*- 'oppress') and *kari-kṛ*- (from the root √*kṛ*- 'make'), the aorist stem *am-am-a*- (from the root √*am*- 'injure'), the perfect stems *aan-aṃś*- (from the root √*aṃś*- 'attain') and *u-vaac*- (from the root √*vac*- 'speak'), and the intensive stem *ii-yaa*- (from the root √*yaa*- 'go').[4] There is thus considerable diversity in the actual form that the reduplicative template takes, in terms of the number of both consonant- and vowel-slots. Admittedly, in more recent and hence more prosodic (including more moraic) versions of Prosodic Morphology like that of McCarthy & Prince 1986-MS, such diversity can be somewhat reduced, since the number of moras in the templatic prefix is limited to a range from one to three, but it cannot be eliminated completely.

Fourth and finally, the reduplicative template in Sanskrit shows large differences in its placement. While the unmarked norm mostly involves prefixing of the reduplication-syllable, as in all the examples shown here so far, there are also reduplicated stems with infixing--and possibly suffixing--reduplication in a particular subclass of desideratives and aorists: e.g., *e-di-dh-iṣa*- (desiderative stem of √*edh*- 'thrive'), *aa-pi-p-a*- (aorist stem of √*aap*- 'obtain'--suffixal if segmented *aap-ip-a*-), and *ar-ji-h-iṣa*- (desiderative stem of √*arh*- 'deserve', cited only in native Sanskrit grammatical literature).[5]

Despite all these differences, several pieces of evidence point to the clustering--i.e., the convergence or unity--of the various reduplication-rules in Sanskrit (note also the tendency for grammarians and linguists--of virtually all times and theoretical persuasions--to speak of "Sanskrit reduplication", as if it were a unitary phenomenon). In particular, there is first the fact that, however trivial this may seem, all the Sanskrit reduplication-templates contain at least a vowel (and also the copy-triggering feature [+reduplication], in a fully autosegmental analysis). More significantly, all varieties of reduplication in the language show the same regular contrast between two ways of copying root-consonantism with sibilant clusters. That is, root-initial S(ibilant) + (s)T(op)... clusters reduplicate as **T-vowel-ST...-**, as illustrated below, but root-initial S + R(esonant)... clusters reduplicate as S-vowel-SR...-, as also illustrated further below. Hence there is a contrast between, on the one hand, √sthiiv- 'spew' --> ***te**-ṣṭhiiv-/**te**-sthiiv-* (intensive stems, from native grammarians), *√sthaa-* 'stand' --> ***ti**-ṣṭha-* (present stem), *√spṛś-* 'touch' --> ***pa**-spṛś-* (perfect stem), ***pi**-spṛk-ṣa-* (desiderative stem), *√stu-* 'praise' --> ***tu**-ṣṭav-* (aorist stem), and *√ścand-* 'shine' --> *cani-ścand-* (intensive stem), vs., on the other hand, *√smṛ-* 'remember' --> ***saa**-smṛ-* (intensive stem), ***su**-smuur-ṣa-* (desiderative stem) [both from native grammarians], and *√śru-* 'hear' --> ***śu**-śraav-* (perfect stem), and ***śu**-śruu-ṣa-* (desiderative stem). That this constraint is not just a general phonological one is shown by non-reduplicative *-s-* aorists like *a-sto-s-ṭa* '(s)he praised'), where two Sibilant + Stop clusters occur across a sequence of adjacent root- and suffix-morphemes. We may certainly conclude, then, that there are some unifying features evident amidst the diversity of Sanskrit reduplication.

One final feature may be adduced in order to highlight the striking extent to which both unity and diversity can be found within and among the various Sanskrit reduplications. There is an idiosyncrasy associated with five roots which begin with a palatal stop such that, when these roots occur in a reduplicated category, the initial palatal shows conversion to an initial velar--via a process referred to in most grammars as "reversion", due to the history of the segment in question. All reduplicated categories where this reversion occurs show it in the same way, i.e. with a palatal reverting to a velar, even though there are other synchronic alternations in which a palatal alternates with a retroflex consonant (e.g., the stem *raaj-* 'king' has a vocative singular *raaṭ*). Thus, the precise form taken by the reversion when it occurs provides a unifying feature which cuts across the various reduplicative categories. On the other hand, this reversion process is not found uniformly in all the different categories, since it always occurs in the desiderative but only sporadically in the other categories which are marked by reduplication. If we group these simultaneously converging and diverging properties according to the five "reversion"-verbs in question, the results are as follows. The root *√ci-* 'note' always appears in "reverted" form (here boldfaced)--i.e., as *ci-**ke**-* (present stem), *ci-**kii**-ṣa-* (desiderative stem), and *ci-**kaay**-* (perfect stem). The root *√cit-* 'perceive' also shows up reverted as *ci-**ket**-* (perfect stem), *ci-**kit**-sa-* (desiderative stem), and *ce-**kit**-* (intensive stem), but native Sanskrit grammarians additionally cite the "unreverted" forms *cii-**cit**-* (aorist stem) and *ci-**cet**-* (an alternative perfect-stem). The root *√ji-* 'conquer' similarly appears reverted as *ji-**gaay**-* (perfect stem) and *ji-**gii**-ṣa-* (desiderative stem), but there also exist the unreverted forms *jii-**jay**-* (aorist stem) and *je-**jiiy**-* (intensive stem, from native grammarians). Finally, the root *√hi-* 'impel' likewise shows up reverted as *ji-**ghy**-* (present stem) and *ji-**ghii**-ṣa-* (desiderative stem, from grammarians), but this contrasts with unreverted *jii-**hay**-* (aorist stem, from grammarians), while the root *√han-* 'smite' only appears reverted, as *jii-**ghan**-* (aorist stem) and *jañ-**ghan**-* (intensive stem).

When we total up these and the previously mentioned other differences which distinguish reduplicative subtypes across subcategories and lexical items in Sanskrit, we find that we need an extremely large number of individual templates in order to account for all the various categories and items in the language which are marked by reduplication. Even a look at a single reduplicative category reveals considerable diversity. On the following page we give, for example, a full listing of all the templates required just for the reduplicated aorist, along with an indication of how frequent each template-type is. This reduplicated-aorist category can be treated as more or less representative for the entire range of templates needed in Sanskrit. Especially noteworthy, moreover, is the fact that several roots show variation in the templates associated with them for a given category--for instance, *√pat-* 'fall' has as its reduplicated-aorist stems both *pii-pat-* and *pa-pt-*.

The Subregularities in One Sanskrit Reduplicated Verbal Category--the Reduplicated Aorist--with an Indication of Type Frequency (based on tables in Whitney 1885)

TEMPLATE	EXAMPLES	ROOT	FREQUENCY	COMMENTS
1. [C V V] - [C V ...]$_{\text{ROOT}}$ \ / i	pii-pat- vii-var-	√pat- 'fly' √vṛ- 'cover'	73	Default template; see comment on (3).
2. [C V] - [C C V ...]$_{\text{ROOT}}$ | i	pi-plav-	√plu- 'float'	24	Can be derived from (1) with ii -->i /_CC, as root always #CC-; C-reduplication subject to cluster-constraint (T...ST but S...SR).
3. [C V V] - [ ]$_{\text{ROOT}}$	nuu-nu-	√nu- 'praise'	24	Reduplication vowel is copy of root vowel; 12 roots not counted here but in (1).
4. [C V] - [ ]$_{\text{ROOT}}$	su-ṣu-	√su- 'generate'	22	Reduplication vowel is copy of root vowel; 5 roots with -i- not counted here but in (5). Some could involve shortening from (3), as in (2).
5. [C V] - [ ]$_{\text{ROOT}}$ | i	di-dhṛ-	√dhṛ- 'hold'	7	Different from (2) due to absence of root-shape constraint in template.
6. [C V V] - [ ]$_{\text{ROOT}}$ \ / a	vaa-vṛ-	√vṛ- 'cover'	1	Note multiple templates for this root (also (1)).
7. [V...]$_{\text{ROOT}}$ - [V C] | i	aap-ip- arp-ip-	√aap- 'obtain' √arp- 'cause to go'	2	Could be infixed reduplication if segmented aa/r-pi-p- (similar forms in other categories, especially desiderative, point to infix analysis (J&J '86)); arp- perhaps not a root sensu stricto but is a special root-form in causative.
8. [V C] - [V...]$_{\text{ROOT}}$	am-am-	√am- 'injure'	1	Like (4) but for VC-roots; could be suffixal reduplication if instead analyzed as [V...]$_{\text{ROOT}}$- [V C].

3. Meta-Templates vs. Meta-Redundancy-Rules in the Analysis of Sanskrit Reduplication.

This unity within diversity shown by the Sanskrit reduplication-templates is reminiscent of the situation which prompted McCarthy's 1979, 1981 templatic analysis of Semitic-type morphology--especially the Arabic (and Hebrew) verb-classes ("binyanim"). For Classical Arabic, e.g., McCarthy 1981:386 [(13)] first notes that, although there are fifteen binyanim (for triliteral roots), they instantiate only eight different canonical C/V-patterns: namely, (a) CVCVC, (b) CVCCVC, (c) CVVCVC, (d), CVCVCCVC, (e) CVCVVCVC, (f) CCVCVC, (g) CCVCCVC, and (h) CCVVCVC. He then points out (p. 387 [(14a)]) that these prosodic skeleta share "certain obvious regularities" which can be expressed by positing (in addition to an adjustment rule[6]) a single "template" that "generates all and only the observed ... patterns": roughly, [(C(V))CV([+seg])CVC]. Given this precedent, we might then immediately consider whether at least the varying C/V structure of the numerous templatic prefixes required for Sanskrit reduplication can be unified in a similar fashion.

However, an approach using such a "template-generating template" is not really available for the Sanskrit case, since the variety of patterns there is collapsible only via the brute force of a curly-bracketed three-part disjunction--i.e., by something like {C(VC)V(V), V((V)C), CVC}. Simpler alternatives which overgenerate are easily imaginable (again in more prosodic--e.g., moraic--frameworks like that of McCarthy & Prince 1986-MS), but these all turn out to involve numerous ad-hoc adjustment rules which possess no independent motivation. In J&J '86, '89, we therefore adopted the processual alternative of analyzing Sanskrit reduplication as primarily an operation of V-affixation that applies both as a rule by itself and also as a part of numerous more specific rules which combine it with various other processes affixing C's and/or additional V's. In this account, Sanskrit "reduplication" is actually a set of particular reduplication-rules which can be said to cohere--as a morphological "rule-constellation"--because a "meta-redundancy-rule" of vowel-affixing reduplication "parses" as identical all the occurrences of that operation which are found in the various individual rules. Meta-redundancy-rules are here simply redundancy-statements which express the fact that a shared element of form which recurs across two or more uncollapsible rules may be evaluated as indeed the same element and so recognized as constituting (part of) one generalization. They are thus entirely parallel to lexical redundancy-rules, which can similarly be used to show that a recurrent formal identity across two or more lexical representations constitutes (part of) one generalization.

Nevertheless, as already mentioned in the Introduction, the recognition of meta-redundancy-rules in morphology effectively depends on the prior acceptance of morphological processes and hence of Process Morphology, whereas the continuing trend in Prosodic Morphology has been to exploit prosodic representations and quasi-phonological association-conventions in such a way as to eliminate or at least to minimize the role of any specifically morphological processes. We are thus led to consider whether the meta-redundancy rules of Process Morphology do not in fact have an analytically plausible and notationally feasible counterpart within Prosodic Morphology. It is our primary contention in the present paper that this can indeed be established to be the case.

In Prosodic Morphology, that is, rather than positing meta-redundancy-rules, we need only make a small, intuitively consistent extension of existing resources in order to recognize the parallel notion of "meta-templates". Rather than themselves being full templates and generating entire templates (in the abovementioned manner of McCarthy 1979, 1981), meta-templates simply state incomplete identities across templates. Thus, e.g., the unity of Sanskrit reduplication can be captured by a meta-template like [[...V...] [ROOT]] (plus a supplementary annotation which governs the copying of sibilant+consonant clusters). Hence, whereas simple templates of the usual sort express the complete canonical form consistently taken by one prosodic morpheme when it is combined with different segmental morphemes (e.g., Classical Arabic 1st-binyan CVCVC shows what is shared across *katab /kutib* 'write (active/passive)', *fa9al* 'do', *najad* 'help', and *samam* 'poison', etc.), meta-templates express the partial canonical form consistently taken by two or more prosodic templates. In the present case, then, the [...V...] in the abovementioned meta-template for Sanskrit expresses the constant element that is shared across the entire set of reduplicative prefix-templates CV-, CVV-, CVC-, CVCV-, CVCVV-, VC-, VVC-, and V-. Indeed, a single meta-template can in this way unify the entire range of diverse simple templates required for the numerous nominal and verbal reduplications of Sanskrit. And this approach is then immediately available for expressing the unity of the various NHG umlauts--whereby we may even supplement the fronting umlauts discussed above in Section 1 with the so-called "Germanic" or raising umlaut of *e* to *i*. That is, of the three NHG umlauts illustrated by the pairs *brech-e/brich-t* '(I) break'/'((s)he/it) breaks', *Brauch/Bräuche* 'custom'/'customs', and *groß/größer* 'big'/'bigger', the first raises mid front vowels, the second fronts all back vowels (while raising low ones), and the third fronts most back vowels (again raising low ones) but does not apply to /au/ or in polysyllables. Yet all three umlauts can be brought together under the single meta-template [...[...[V, -back, -low]...]$_{\text{ROOT}}$...].

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It must be emphasized, however, that, since meta-templates express only partial canonical forms, they do not in fact generate the actual templates of a language. That is, one cannot avoid lexically listing specific templates for particular morphological categories like those marked by umlaut in German or reduplication in Sanskrit, even if one can use meta-templates to capture the formal similarities which exist between and among such templates. This point can be made clearer by recalling that it is not only the C/V-shape of Sanskrit reduplicative prefix-templates which varies according to category and lexical item, but also whether such templates are prespecified or not, and what their potential prespecification is. Even a cursory second look at the overview of Sanskrit reduplicated aorist-forms given above should suffice to establish the conclusion that no single representation, rule, or principle can generate the full variety of C/V-shapes, prespecifications, and positions exhibited by the subset of templates in question--much less the complete set of verbal as well as nominal templates for reduplication in the language. It is in this sense that the title of our paper mentions the underlying (dis-)unity of reduplication in Sanskrit morphology: there is much that is shared across the realizations of the various reduplicating categories, and this can can be captured with meta-templates, but the fact remains that individual reduplicative templates must be lexically listed for every category and for large numbers of individual words. Nor do we feel that this situation should be viewed as particularly unusual or even at all surprising: given its inherent interaction with the lexicon, morphology is obviously that part of grammar in which we should expect to find the greatest concentration of such "local generalizations" (cf. J&J '88).

Indeed, as we have here previously suggested, analyses which involve the listing of numerous individual templates whose commonalities are expressed via meta-templates are not only implicit in the notation of Prosodic Morphology but have in fact already been tacitly employed by practitioners of that theory--and by no less a figure than McCarthy 1979, 1981. The crucial element in this regard has to do with the extreme degree of prespecification required by McCarthy's 1981:388-394 analysis of the "binyanim" in the Classical Arabic verb-system. Out of fifteen binyanim, only five (one third of the total) have no prelinked consonants, their templates thus being as follows: (I) CVCVC, (II) CVCCVC,[7] (III), CVVCVC, (IX) CCVCVC, and (XI) CCVVCVC. As for the ten remaining, prespecified binyanim (two thirds of the total), six have one or more consonants prelinked in initial position; their templates are as follows (where, as a space-saving measure, we have represented the prespecified consonants in boldface on the same line as skeletal C's and V's, thereby replacing the C's to which they actually attach): (IV) **?**VCCVC, (V) **t**VCVCCVC,[7] (VI) **t**VCVVCVC, (VII) **n**CVCVC, (VIII) **t**CVCVC,[8] and (X) **st**VCCVC. Finally, the last four binyanim must be prespecified at least for a consonant in medial position (which obviously must be linked via language-particular stipulations, rather than general principles); they have the following templates: (XII) CCV**w**CVC,[7] (XIII) CCV**w**CVC,[7] (XIV) CCV**n**CVC, and (XV) CCV**n**CV**y**.

When this set of predominantly and diversely prespecified templates for the binyanim of the Classical Arabic verb is compared with the "template" [(({C, CV})CV([+seg])CVC]--which McCarthy 1981:386-387 describes as "generat[ing]... all and only the observed canonical patterns of the binyanim"--it becomes clear that such a "template" really does not even come close to generating the full set of binyanim. Rather, it generates only C/V skeleta (and thereby the five binyanim which consist of a prosodic skeleton and nothing more). Consequently, though, McCarthy's putative "template-generating template" actually generates just parts of individual templates--as well as relating corresponding template-parts to one another--and so it is arguably a meta-template in the sense which we have introduced in this paper. Once more, we see a case where specific individual templates for particular morphological categories of a language must be lexically listed (along with a considerable amount of prespecification),[9] whereby such individual representations can in no way be entirely generated by a single (other) representation, rule, or principle. Instead, such shared aspects of morphological structure as exist in instances of this sort must be expressed by redundancy-rule-like statements such as meta-templates.

4. Conclusions and Implications.

Although we here originally presented the prosodically tailored concept of "meta-template" as an analogue of the notion "meta-redundancy-rule" in Process Morphology, there is in fact some reason to believe that basing such a notion of redundancy-expressing statements completely or primarily on rules is insufficiently general. For example, even the early processually-oriented analysis along similar lines in Janda 1982b actually employed a template-like approach, proposing to capture recurrent formal identities across morphological processes by positing a set of lexically listed "formatives" (formal operations) which "parse" the identical portions shared by processual rules of morphology. Similar suggestions have since been made by, among others, Schmerling 1983 (concerning "operations") and Zwicky 1988 (concerning both operations and "operation types"). In Janda and Joseph 1990-MS, too, we have ourselves referred to meta-redundancy-rules as "[partial] rule-templates" within a Process Morphology framework.[10] Most importantly, Frank 1991 has recently shown that there can be shared similarities of the requisite sort, not only between and among rules, but also between and among representations, as well as between rules and representations. Based partly on examples which have to do with cross-categorial (nominal and verbal) similarities like the *-i* which in Modern Hebrew occurs both in the pronoun *ani* 'I' and in past-tense forms like *zaxarti* 'I remembered', she also adopts a view of meta-redundancy-statements which is not entirely or essentially rule-based.

We conclude, then, that meta-redundancy-rule/meta-template phenomena represent an important point of possible future rapprochement (or at least approximation) between Process Morphology and Prosodic Morphology. We would further emphasize that, even with the current supremacy of "Radical Underspecification" (cf., e.g., Archangeli 1988) in phonology and many related grammatical domains, the general issue of redundancy rules has not been entirely absent from recent theoretically important discussions of major topics in these fields (cf., e.g., Halle and Vergnaud 1987: 148-153 on redundancy rules as "i[nternal]-rules"). Indeed, we believe that the question "Does your theory explicitly recognize redundancy rules?" is no less important and potentially revealing for all areas of linguistics than is the question "Do you believe in an eternal soul?" for discussions of human life and death. But, to end on a less grim note, we exhort our colleagues to explore further the issues raised in this paper by suggesting to them that, had Will Rogers been a 1990's morphologist, he would have said, "I never met(-)a-template I didn't like".

NOTES

* We are grateful to Alec Marantz for critical but helpful comments on this paper made in the course of the discussion after its presentation at ESCOL VIII in Baltimore during October, 1991. For additional discussion and help of various other kinds, we would also like to thank J. Auger, K. Beals, J. Denton, D. Kathman, and C. Wiltshire.

1. Given that such "meta-redundancy-rules" express partial identities across individual morphological rules, it is important that we specify what notation we are here assuming for specific processes of the latter sort. For present purposes, we employ the "Extended Word-and-Paradigm" rule-format developed by Anderson 1977, 1982, 1992 following earlier work by Matthews 1965, 1972, etc. (for a similar but slightly different format, see also Hoeksema & Janda 1988). It should further be pointed out that, even in the case of a language which is, say, exclusively suffixing but has no formal similarities across (the morphological rules inserting) its suffixes, some kind of meta-redundancy-rule will still be required in order to express the generalization that all affixes are in fact suffixes: e.g., /...X.../ --> /...X...+Y/, where Y = [-root]. And this must be true regardless of whether affixes are treated as the results of affixation rules (as above) or as lexical items inserted according to various restrictions on subcategorization--in which case there must be some meta-subcategorization requiring all affixes to follow their roots. When formulated in the latter way, it is clear that generalizations of this type are essentially parallel to those needed for expressing consistent syntactic distributions like, e.g., the fact that a language may require all of its modifiers to precede their heads. Such issues are of course much discussed in the syntactic literature by works on crosslinguistic typology (e.g., Vennemann & Harlow 1977 and Hawkins 1983) and by studies within theories like Government/Binding (GB; e.g., Travis 1984 and Speas 1990; cf. also the pre-GB treatment of Jackendoff 1977) or Generalized Phrase-Structure Grammar (GPSG; e.g., Gazdar et al. 1985). Still, the generalizations in question are rarely specified more explicitly than via a statement that they "assum[e the schemata of]... some version of X-bar theory" (cf. Pullum 1985).

2. The polysyllabic NHG adjective *gesund* 'healthy' shows umlaut in its comparative and superlative, but since this form can actually be considered to have the bimorphemic stem *ge-sund*, with a monosyllabic root, it clearly conforms to the generalization discussed in the main text (which

Lieber 1987:99-111, in an otherwise thorough prosodic analysis of NHG umlaut using a floating [-back] autosegment, inexplicably fails to mention).

3. In such adverb-like nominal reduplications as abovementioned *ratha:-rathi* 'chariot against chariot' (cf. *ratha-* 'chariot'), the more extensive reduplication-pattern (one more nearly involving full words) correlates with a lack of prespecification for non-aspiration and hence parallels the length/non-aspiration correlation found with verbal reduplication in Vedic intensives. However, while the intensive configuration is found only in Vedic, the nominal pattern is found only in the later language (i.e., Classical Sanskrit).

4. Even in the face of forms like abovementioned aorist-stem *am-am-a-* and perfect-stem *aan-amś*, one could attempt to argue that all reduplicative prefix-templates in Sanskrit are consonant-initial by attributing such vowel-initial surface-shapes of the reduplicated prefix to the fact that the roots being copied are likewise vowel-initial (cf. √*am-* 'injure' and √*aṃś-* 'attain') . However, this explanation will not work for abovementioned perfect-stem *u-vaac-* and intensive-stem *ii-yaa-*, since their corresponding roots are (or can be) consonant-initial (recall √*vac-* 'speak' and √*yaa-* 'go'). As a result, it indeed appears that at least some of the templatic prefixes for Sanskrit reduplication must be vowel-initial. And of course even the just-entertained artifice of a uniformly consonant-initial reduplicative prefix cannot account for the variation in the rest of the template (...V, ...VV, ...VC, and ...VVC) which exists across the various Sanskrit morphosyntactic categories that are marked by reduplication.

5. For arguments that forms like these indeed do not involve prefixation, see J&J '86.

6. The adjustment rule at issue (V -> Ø / [CVC __ CVC]; McCarthy's 1981:387 [(14b)]) is in fact required because the overall "template" that generates the specific templates for the individual binyanim actually overgenerates, producing the unattested C/V skeleton CVCVCVC--which the abovementioned rule then changes to CVCCVC (identical to the skeleton given as (b) in the main text). McCarthy 1981:387, 402 argues that this syncope rule is independently motivated by an alternation in the imperfective of verbs in binyan I, but such motivation does not eliminate the redundancy involved in having two sources for the C/V skeleton shared by binyanim II and IV. The latter problem obviously disappears if McCarthy's "template-generating template" is reinterpreted as a "meta-template", as we later suggest.

7. Binyan II (along with Binyanim V, XII, and XIII) later undergoes a delinking erasure-rule that provokes reassociation, which has the effect of ensuring that there is doubling of a non-final consonant; in Binyanim II, V, and XIII, this results in a medial geminate (cf. McCarthy 1981:388-394). Binyan XII differs from XIII in that only the former shows reassociation of a root segment.

8. The prelinked *t* in Binyan VIII ends up on the surface as not the first but instead the second consonant; McCarthy 1981:389-390 achieves this effect via a rule which he dubs the "Eighth Binyan Flop". Given that this is not a phonological rule of Classical Arabic, it seems that even Prosodic Morphology is occasionally forced to engage in the unheralded use of morphological processes; a similar conclusion seems to hold for the erasure rule mentioned above in Note 7. If, alternatively, the *t* in question is prelinked in second position, then it increases the number of binyanim with medial prespecification to five (one third of the total)

9. Given that McCarthy 1979, 1981 discusses most of the prespecified consonants associated with the binyanim of the Classical Arabic verb as "affixes", and that some of these consonants are associated with a fixed prosodic skeleton, it is puzzling that he does not treat such skeletal shapes as concomitant properties of their "affixes", as Archangeli 1983 does for a parallel situation in Yawelmani. That McCarthy fails to address this issue is perhaps due to the fact that the Classical Arabic "affixes" are often medial or at least linked to what he considers the entire template for a binyan, whereas in Yawelmani the affixes discussed by Archangeli are always suffixes which can be treated as entirely external to the root C/V-skeleton.

10. Anderson 1986 has discussed such meta-redundancy rules as "meta-rules" in the sense of Generalized Phrase-Structure Grammar (GPSG), but, since the latter's meta-rules relate entire rules to one another (rather than just parts of rules) and thus can be used to generate completely new rules, it seems preferable not to equate the morphological concept here at issue with the syntactic notion employed in GPSG (cf., e.g., Gazdar et al. 1985).

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ESCOL '91 174-185

'ANTI-INTERNALIZATION': SUPPRESSION AND PROJECTION OF EXTERNAL θ-ROLES

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The standard GB account of passive and raising constructions involves syntactic movement. Williams (1987a,b) proposes a theory of passive and raising that replaces the syntactic movement of the standard account with the external projection of a θ-role, as in (1).

(1) a. John$_i$ was [$_{VP}$ kissed e$_i$]$_i$.
(A$_\emptyset$, Th$_i$)
b. John$_i$ [$_{VP}$ seemed [e$_i$ to run]$_i$]$_i$.
(A$_i$)

The mechanism by which the *i*-indexed θ-roles in (1) project out of their VPs to *John* is the same mechanism by which external arguments typically are assigned to subject position: Williams calls this mechanism 'vertical binding'. Vertical binding is a kind of λ-abstraction, indicated in (1) by the index on the VP, by means of which at most one θ–role can 'escape' from the maximal projection of its θ-assigning head, ultimately to be assigned to a position external to that maximal projection.

In the standard account, as in Williams' account, passive and raising arise from different conditions. In this paper I propose to unify the two constructions along the following lines: both arise from the interaction of two opposing factors. In both constructions an external argument is suppressed. However, this suppression of the external argument is countered by a requirement that such suppression must be 'made up for' by the external projection of another argument. I call this requirement *anti-internalization*.

Anti-internalization is intended as a principle of θ–theory. As such, it has effects only within the domain in which θ–theoretical mechanisms are at work. Within Williams' θ–theory of passive and raising, anti-internalization not only provides a unification of these two constructions; it improves on both Williams' account and the standard account. The anti-internalization account also extends naturally to the 'retroactive nominal', like that in (2), discussed in Clark (1990).

(2) John's toe$_i$ needs [looking at e$_i$].

Clark's (1990) analysis of the retroactive nominal appears to call for construction-specific properties. The proposed anti-internalization account calls for no such special properties, and hence is to be preferred over Clark's account. Within the larger picture, the ease with which the anti-internalization account extends to the retroactive nominal suggests that its account of passive and raising must be along the right lines.

1. The characteristic external argument

Williams (1980) introduces a minimal amount of organization into the argument structure of a lexical item by distinguishing one of the arguments as the *external argument*: the unique argument that is assigned outside the maximal projection of the lexical item in question. It will be useful to further distinguish this particular kind of external argument. Let us call the argument that is designated 'external' by the lexical properties of the lexical item the *characteristic external argument* (or *characteristic external θ–role*). In this paper we consider cases in which some argument other than the characteristic external argument is projected externally.

2. Anti-internalization

Williams (1983) distinguishes between two kinds of lexical items: those that characteristically project an external θ-role, X_1; and those that do not, X_0. Williams notes a difference in the possibilities available to the maximal projections of these two kinds of lexical items. The maximal projection of an X_0 like *seem* either can project no external argument, as in (3a), or can externally project one of the arguments of the complement of *seem*, as in (3b). Hence the maximal projection of an X_0 can be either XP_0 or XP_1.

(3) a. It [$_{VP_0}$ seems$_0$ [$_{CP}$ that John ran]].
    b. John$_i$ [$_{VP_1}$ seems$_0$ [e$_i$ to run]$_i$]$_i$.

Williams observes that the maximal projection of an X_1, on the other hand, always projects an external argument.[1] In Jones (1990) I propose that this property of the maximal projection of an X_1 should be no accident, but should rather be a consequence of a principle like that in (4).

(4) The maximal projection of an X_1 must project an external θ-role (i.e., must be an XP_1).

If we assume that the features of the head are shared by the features of the maximal projection, then we can state (4) as a general prohibition against changing the feature that signals the characteristic projection of an external argument, as in (5), which I will call *anti-internalization*.

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[1] Throughout this paper I will abstract away from atypical cases of external argument suppression, especially in certain passives, that call for special treatment in any theory. These kinds of special cases include (i) 'impersonal' passives and (ii) passives with accusative objects.

i. Es worde bis spät in die Nacht getrunken.
   it was till late in the night drunk
   'Drinking went on till late at night.' (German: Jaeggli (1986: (22b)))

ii. Stadion bulo zbudovano v 1948 roc'i.
   stadium(acc.masc.) be+past+neut. build+part.+neut. in 1948
   'The stadium was built in 1948.' (Ukrainian: Sobin (1985: (1)))

I discuss how these kinds of cases relate to anti-internalization briefly in Jones (1990: 320, fn 9).

(5) *Anti-internalization*
$\forall(x \mid x \in \{X^{\circ}_1, XP_1\}) * x_0$

3. Passive

For concreteness, let us first look at a typical case of passive. The standard assumption about the phenomenon that gives rise to passive is that the characteristic external argument of a verb becomes 'suppressed' in some way. For notation, let us distinguish the characteristic external argument with boldface, as in (6a). This suppression of the external argument of *kiss* paves the way for the discontinuous dependency between the thematically empty subject position and the θ–role of the argument that would typically be assigned to object position, as in (6b).

(6) a. kiss → kiss + ed
(**Ag**, Ob) (Ag, Ob)

b. Mary$_i$ was kissed e$_i$.

In mainstream GB the discontinuous dependency in (6b) is one of syntactic movement. In Williams (1987a,b) the dependency is created by external projection of a θ-role. The mechanism by which an argument is projected externally, 'vertical binding', is bounded by any maximal projection whose head itself projects an external argument. Because the passivized *kissed* in (6) projects no characteristic external argument, some other argument can project through VP to subject position, as in (7).

(7) Mary$_i$ was [$_{VP}$ kissed e$_i$]$_i$.

The discontinuous dependency between subject position and object position that is typical of passive presents several kinds of problems, among which are (a) what are its necessary conditions, (b) what factors determine which positions participate in the passive dependency, and (c) what motivates the discontinuity? If we adopt the standard assumption about (a), that the passive morphology is responsible for the conditions that set up passive, then an account of passive based on anti-internalization gives a more satisfactory account than either the standard account or Williams' own θ-theoretical account.

3.1 *Passive morphology*

The standard assumption about the passive morphology, call it '*-en*', is that it is responsible for the 'suppression' of the characteristic external argument. This can be accomplished in a couple of ways.

Williams (1981) proposes that there exist only a couple of kinds of morphological operations: 'Internalize (θ)', or 'I(θ)', which internalizes an external argument and adds a new one; and 'Externalize (θ)', or 'E(θ)', which externalizes an internal argument, at the expense of the internalization of the characteristic external argument. The former rule increases the number of arguments by one, the latter keeps the number of arguments the same. In Williams' (1981) theory, passive morphology is a case of 'Externalize (Ø)', in which the characteristic external argument is internalized, but no replacing argument is externalized. In

E(Ø) the number of arguments remains the same, however the characteristic external argument is kept from projecting externally by the passive morphology.

One way of keeping the characteristic external argument inside the VP would be to actually assign it VP-internally. This is essentially the idea in Jaeggli (1986) and Baker, Johnson, & Roberts (1989). Actual assignment of the characteristic external θ-role to a VP-internal position has the added advantage of getting the distribution of the passive gap exactly right, providing an answer to question (b). Let us see how this is accomplished.

Assume, as is standard, some formulation of Case Visibility, which requires positions to which θ–roles have been assigned to be associated with a position to which Case has been assigned. If the passive morphology on a verb is assigned a θ-role, then it will need Case. The structural Case of the immediately associated verb is a reasonable choice for the appropriate Case. In such a scheme of things, we derive the fact that passive gaps are typically in positions of structural Case assignment, as illustrated in (8).[2]

(8) a. The car_i was put e_i into the garage.
b. * The garage_i was put the car into e_i.

Henceforth I will adopt the morphological account of the suppression of the characteristic external argument in a passive construction, and will assume the Case-determined account of the distribution of the passive gap that it allows us. We will have more to say about Case below.

3.2. *Driving passive*

The question remains why the discontinuous dependency typical of passive is forced. That is, given a dethematized subject position and a Case-less object position, we need some motivation to force the subject position to serve as 'host' for the object argument. Without some kind of motivation, we would expect structures like (9).

(9) $e_\emptyset$/$\text{there}_\emptyset$/$\text{it}_\emptyset$ was kissed e.
[- θ] [- Case]

The standard motivation for the passive discontinuous dependency is Case Visibility. Chomsky's (1981) formulation of Case Visibility is in (10).

(10) *Case Visibility*
Suppose that the position P is marked with the θ-role R and $\mathbf{C} = (\alpha_1,\ldots,\alpha_n)$ is a chain. Then **C** is assigned R by P if and only if for some i, α_i is in position P and **C** has Case or is headed by PRO.

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[2] In any theory, pseudopassives like that in (i) will call for special consideration.

i. That bed_i was slept in e_i.

Reanalysis, constrained by a kind of 'natural predicate' condition, is a reasonable story about these constructions. Cf. Hornstein & Weinberg (1981), Jones (1988, 1991) for discussion.

A problem with Case Visibility is its 'PRO disjunct', which allows what the primary clause of Case Visibility forbids: θ–role assignment to a Caseless position.[3] The PRO disjunct is necessary because of cases like (11), where the passive dependency is discontinuous between two phonetically empty positions.

(11) John tried [PRO_i to be kissed e_i].

Anti-internalization provides an alternative motivation for the passive dependency. In a θ–theoretical account of passive, where the dependency is one of external θ–role projection, anti-internalization would force the projection of some internal θ–role in lieu of the 'suppressed' characteristic external argument.

With anti-internalization motivating the passive discontinuity, Case Visibility, which does such a good job determining the position of the passive gap, can be reformulated in such a way as to rid it of the objectionable PRO disjunct. Note that the PRO disjunct of Case Visibility refers distinctly to the unique argument position that is outside the government domain of a head V. Suppose that Case Visibility is restricted to the government domain of a head.[4]

(12) *XP-internal Case Visibility*
Within the government domain of a head X°, suppose that the position *P* is marked with the θ-role *R* and **C** = $(\alpha_1,...,\alpha_n)$ is a chain (of Ā-movement)[5]. Then **C** is assigned *R* by *P* if and only if for some i, α_i is in position *P* and **C** has Case.

On the assumption that the characteristic external argument is assigned, VP-internally, to the passive morphology, the XP-internal Case Visibility in (12) would determine that the typical passive gap would be found, as it in fact is, in the position of structural Case assignment.

Anti-internalization, in concert with XP-internal Case Visibility, is also an improvement over the driving force proposed for passive in Williams (1987b). There Williams proposes that the passive dependency should be driven by the characterization of NP trace in (13).

(13) NP trace can be assigned a θ-role, but cannot satisfy a θ–role.

On the assumption that θ–roles must be 'satisfied', the NP trace characterization in (13) would drive the external projection of the VP internal θ–role of (base generated) NP trace for its ultimate 'satisfaction'. Aside from its stipulative nature, however, (13) suffers because it provides no independent characterization of just which VP-internal θ–role is to be base generated as NP trace. Insofar as Case provides the empirically responsible characterization of that position, a theory with some form of Case Visibility is to be preferred to Williams' theory.

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[3] This is not to say that any disjunctive condition is irredeemably flawed by the disjunction. However, it is reasonable to be suspicious of a disjunction in which one disjunct allows virtually exactly what the other disjunct forbids. There are various conceivable ways of ameliorating the contradictory nature of the PRO disjunct; e.g., assume PRO is assigned some 'special Case' that allows it to remain phonetically empty. In what follows, I propose a more direct kind of amelioration: arrange things so the need for the PRO disjunct disappears.

[4] So restricted, Case Visibility would be a principle on a par with the 'unextended' part of the Projection Principle. Cf. Chomsky (1982) for the extension of the Projection Principle, and Jones (1991) for arguments that the Projection Principle should remain unextended.

[5] Williams (1987a,b) points out that, in a θ-theoretical account of A-dependencies, there is no need for the notion of 'A-chain'. That is, because A-dependencies like passive and raising are created not by movement, but by θ–role projection, there exists a principled distinction between these kind of dependencies and Ā-dependencies, which involve (genuine) syntactic movement.

Hence, anti-internalization affords us with the best of both worlds. With XP-internal Case Visibility, it both drives passive and gives us the appropriate determination of the position of the passive gap. It also allows us to dispense with the PRO disjunct of Case Visibility.

4. Raising

Williams' (1987a,b) account about raising strongly mimics the standard account, insofar as it postulates that raising is possible only out of S (= IP) and never out of S′ (= CP). Williams' account of raising proceeds along the following lines.

The Comp head of CP differs from the Infl head of IP in that Comp characteristically assigns an external θ–role, while Infl does not. The characteristic external θ–role of Comp, call it '**C**', is analogous to Williams' (1981) characteristic external **R** θ–role of N, by which an NP receives its referential interpretation, as in (14a). It is by means of the external θ–role of Comp that clausal elements satisfy the requirements of the lexical items that subcategorize for them, as in (14b).

(14) a. John kissed Mary.
$(\mathbf{R}_i)$ $(\mathbf{A}_i, P_j)$ $(\mathbf{R}_j)$

b. John said $[_{CP}$ that $[_{IP}$ he was sorry$]]$.
$(\mathbf{R}_i)$ $(\mathbf{A}_i, Th_j)$ $(\mathbf{C}_j)$

In the case of a raising structure, the external argument-less IP presents no barrier to the projection of the external argument of the embedded VP, as in (15).

(15) John$_i$ $[_{VP}$ seemed $[_{IP}$ e$_i$ $[_{VP}$ to run$]_i]_i]_i$.
$(\mathbf{A}_i)$

As with passive, the standard motivation for raising 'movement' depends on the PRO disjunct of Case Visibility. In the standard account, the subcategorizing raising predicate deletes the S′ projection of its complement, yielding a structure like (16a).

(16) a. ... seemed $[_{IP}$ e $[_{VP}$ to run$]]$...

The nature of the empty element in the subject position of the IP complement is determined in the following manner. The subject position is governed by the subcategorizing verb, hence the empty element cannot be PRO. The subcategorizing verb does not exceptionally assign case to the embedded subject position, nor is the position assigned case by a finite Infl head in the embedded clause. Hence the position of the empty element in the raising structure fails both clauses of Case Visibility. Raising to a superordinate subject position, either Case-marked or PRO, is thus forced, as in (17).[6]

(17) a. John$_i$ seemed [$_{IP}$ e$_i$ [$_{VP}$ to be running]].
b. ...[PRO$_i$ to seem [$_{IP}$ e$_i$ [$_{VP}$ to be running]]...

Anti-internalization, along with an independently motivated mechanism of function composition, can provide a characterization of raising which rationalizes the phenomenon of S′-deletion, and provides motivation for raising, as the external projection of an argument, without the need to appeal to a PRO disjunct. First let us examine function composition in the context of control structures, and then return to raising structures.

Williams (1987a) argues that function composition is called for by structures of subcategorized obligatory control. Consider a typical case in (18).

(18) John$_i$ tried [$_{CP}$ Ø [$_{IP}$ e$_k$ [$_{VP}$ to run]$_k$]$_k$]$_{k?\,/\,j?}$
(**A**$_i$, **Th**$_j$) (**C**$_j$) (**A**$_k$)

In (18), nothing in principle prohibits the projection of the external *k*–argument of *run* past the external argument-less IP projection. However, at the CP projection, the external argument of *run* is in 'competition' with **C**, the characteristic external *j*–argument of Comp. In Williams' scheme of things, when a head and a non-head enter into function composition, and both have external arguments, the external argument of the head 'wins', and the external argument of the non-head becomes an internal argument of the head, as in (19).

(19) John$_i$ tried [$_{CP}$ Ø [$_{IP}$ e$_k$ [$_{VP}$ to run]$_k$]$_k$]$_j$
(**A**$_i$, **Th**$_j$) (**C**$_j$, **A**$_k$) (**A**$_k$)

Let us return now to raising structures. Let us assume that raising predicates uniformly subcategorize for full CP clauses, yet are able, under lexical government, to 'suppress' the external characteristic **C** argument of Comp. Under these circumstances, we could imagine function composition working in a direction opposite from that which obtains in control structures. A head (C of CP) and a non-head (IP) enter into function composition, but only the non-head projects an external argument. In such a case, the external argument of the non-head would 'win', and the maximal projection of the head would project an external argument, in accordance with anti-internalization, as in (20).

(20) John$_k$ seemed [$_{CP}$ Ø [$_{IP}$ e$_k$ [$_{VP}$ to run]$_k$]$_k$]$_k$
(**Th**$_\emptyset$) (**C**$_\emptyset$, **A**$_k$) (**A**$_k$)

In (20) the dictate of anti-internalization is satisfied not by supplying some other lexically available θ–role for external projection, as in the case of passive, but by the appropriation of an alternative external argument via function composition.

In the present account, the PRO disjunct of Case Visibility remains expendable; and raising appears both as the compositional converse of control and as a close relative to the external argument-suppressed passive.[7]

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[6] A conversation with Alec Marantz and Ian Roberts greatly clarified for me the nature of the problem posed by raising structures, and I am grateful for their comments.

[7] Depending on your theory of bounding nodes, the anti-internalization account of raising may clear up a well-known problem having to do with constructions like that in (i), in which an

5. Retroactive nominals

Clark (1990) discusses a fairly restricted kind of nominal construction like that in (21a), which, for various theory internal reasons, receives the analysis in (21b).

(21) a. John's toe needs [looking at].
b. John's toe needs [$_{NP}$ PRO$_i$ looking at t$_i$].

Clark's analysis differs from that of Hantson (1984) in treating retroactive constructions with NP properties. These NP properties are supported by the kinds of NP tests outlined in Chomsky (1970): (a) nominal determiners, (b) absence of aspect, and (c) adjectival rather than adverbial modification.

(22) a. i. That article merits [*the* most thorough going over].
ii. This room needs [*a* good picking up].
b. * That case needed [*having* researched].
c i. That article merits [the *most thorough* going over].
ii. * That article merits [the/a going over *thoroughly*].
iii. * That article merits [the/a *thoroughly* going over].

Hantson's analysis treats retroactive constructions as fully clausal constructions.[8] In § 5.1 we outline the clausal analysis of retroactive constructions, and then in § 5.2 we review the problems for the standard theory that are presented by the NP status of the retroactive construction. In § 5.3 we see how to incorporate the advantages of the clausal analysis into an analysis of a nominal retroactive, via anti–internalization.

---

element is extracted from a raising structure.

i. Who$_j$ does John$_i$ seem [e$_i$ to like t$_j$]?

In the classical subjacency account, the S′-deletion that sets up the raising 'movement' deprives the embedded clause of the Comp 'escape hatch' needed for the *wh*-extraction of *who*. In the present anti-internalization account, the S′-structure of the *seem* complement remains intact.

This advantage for the anti-internalization account evaporates in a *Barriers* style account of bounding (cf. Chomsky (1986)), in which S (= IP) has a 'defective' character, which precludes it from being a barrier (= bounding node) in most cases.

[8] Clark (1990) does not discuss the question of category, but Hantson (1984) does, with many different kinds of examples. The problem discussed in the text arises if there exist 'retroactive' constructions of the category NP. I think the properties discussed in § 5.1 of the text justify such an NP status for the constructions under discussion.

Hantson gives examples of 'retroactive' constructions that appear to have clausal properties: (i) acceptance of (i) manner adverbials and (ii) lexical subjects.

i. This matter needs handling *carefully* (by an expert).
ii. You need *your toe* seeing to (by a chiropodist). (from Radford (1977: 59)))

These kinds of constructions are ungrammatical for me, so I have no intuitions about their properties. I have also been unable to find speakers for whom either of these constructions are grammatical. If these constructions are in fact clausal (i.e., if they show other clausal properties, like aspect, and reject nominal elements like determiners, etc.), then they can claim all the advantages of a clausal analysis outlined in § 5.1 of the text.

5.1 What's good about a clausal analysis

Within the set of assumptions of mainstream GB theory, the clausal analysis of the retroactive construction in Hantson (1984) has much to recommend it. First of all, it allows the most natural transformational account: passive. Hantson's analysis of a retroactive like that in (21a) involves a discontinuous dependency just like that of passive, as in (23).

(23) John's toe needs [$_{CP}$ Ø [$_{IP}$ PRO$_i$ looking at t$_i$]].

Hantson's clausal passive analysis also gets the kind of passive-distribution facts about the retroactive nominal gap right. As can be seen in (24), whatever is selectionally OK for passive is OK for the retroactive nominal.

(24) a i. The bed was [slept in e] last night.
ii. * New York was [slept in e] last night.
b.i. This bed needs [some sleeping in e] (before it feels like our old one).
ii. * New York needs [some sleeping in e] (before it can be considered a major city).

5.2 The 'retroactive nominal' as NP

Hantson's analysis of the retroactive construction has several virtues, all of which follow from his characterization of the retroactive construction as an essentially passive structure. However, I will assume that the NP properties illustrated above in (22) force us to consider the properties of a retroactive NP. Problems arise when a retroactive construction must be acknowledged to be truly an NP. Foremost among these problems are the well-known failures of certain sentence-level rules to operate within NP, characterized as 'subject-predicate' rules in Williams (1982): (a) raising, (b) predication, and (c) Obligatory Control.[9]

(25) a.i. John$_i$ [appeared [e$_i$ to leave]].
ii. * [$_{NP}$ John$_i$'s appearance [e$_i$ to leave]]
b.i. John$_i$ arrived dead$_i$
ii. * [$_{NP}$ John$_i$'s arrival dead$_i$]
c.i. * It$_{\emptyset}$ attempted [PRO$_{\emptyset}$ to leave]
ii. [$_{NP}$ any attempt [PRO$_{\emptyset}$ to leave]]

An NP analysis of the retroactive nominal that wishes to preserve the virtues of the clausal passive analysis would have to postulate NP-internal passive-like movement, and this is just what Clark (1990) proposes: "'Move NP' inside NP".

---

[9] Williams draws as a consequence of these 'subject-predicate' failures the conclusion that the standard cases of 'passive' within NP, like the classic example in (i), will have to be given a non-transformational account.

i. ...[$_{NP}$ the city's destruction by the enemy]...

Williams' own conclusion about examples like (i) is that they must involve simply the mechanisms of θ–role assignment. Retroactive nominals present analytical problems to Williams' theory that are not encountered by nominals like (i). Specifically, a retroactive nominal like (21) in the text has a bona fide 'detectable' empty syntactic position: an empty object of a preposition. Such positions are commonly taken to be fair indicators of syntactic movement.

For Clark, the particular nature of the characteristic gap in a retroactive nominal follows from the following arguments. The retroactive nominal gap must be [+ anaphoric] because of SSC effects like those in (26) (= Clark's § 2.2: (21a,b-22a,b)).

(26) a.i. * John could use [a competent psychiatrist's looking at e].
    ii. John could use [a good looking at e by a competent psychiatrist].
  b.i. * These ideas merit [Bill's working on e].
    ii. These ideas merit [some working on e by Bill].

The retroactive nominal gap would have to be [+ pronominal] if its antecedent receives its own θ–role. Examples like those in (27) (= Clark's § 2.2: (24a,b)) indicate that the position of the antecedent of the retroactive nominal gap cannot be pleonastic; hence must receive an independent θ–role.

(27) a. * It$_{\emptyset}$ could use [$_{NP}$ a good talking to John].
  b. * It$_{\emptyset}$ merits [$_{NP}$ some working on these ideas].

The [+ anaphoric, + pronominal] nature of the retroactive gap forces its identification with PRO. The fact that the gap is found in a governed position, a position forbidden to PRO, will force movement of the offending PRO element to some ungoverned position. Hence the "'Move NP' inside NP" mechanism, which yields the structure in (21b), repeated here in (28).

(28) John's toe needs [$_{NP}$ PRO$_i$ looking at t$_i$]

The "'Move NP' inside NP" mechanism is called for by nothing other than the internal workings of the theory that Clark presupposes. Insofar as the examples in (25) indicate that "'Move NP' inside NP" must be seriously constrained, we should welcome an opportunity to get rid of an analysis that relies on "'Move NP' inside NP" in favor of an analysis that has no need of "'Move NP' inside NP". Anti-internalization offers an attractive alternative analysis.

5.3 *Retroactive anti-internalization*

First let us acknowledge that the limited distribution of the retroactive nominal makes it a good candidate for a subcategorized item, selected for by lexical government. Furthermore, as the examples in (29) (= Clark's § 2.8: (100a,b)) indicate, the *-ing* morphology must be operative in setting up the possibility of the retroactive nominal gap.

(31) a. * The baby could use some attention to.
  b. * These diplomats deserve some conversation with.

The *-ing* morphology heads the retroactive nominal, consequently we can allow subcategorization to (optionally) select for that particular feature, in the same way that certain verbs can subcategorize for [±WH] features on their clausal complements. Suppose now that the (subcategorized) *-ing* morphology of the retroactive nominal has thematic properties parallel to those of the passive *-en* morphology: it accepts the assignment of the characteristic external argument of the V to which it attaches, and it specifies no replacing θ–role.[10] That is, let us suppose that the subcategorized *-ing* head of the retroactive nominal exercises the rule of E(Ø) on its embedded V, as in (30).

(30) [$_V$ *look*] ⇒ [$_N$ [$_V$ *look*] [$_N$ *ing*$_i$]]
[__ PP^{at}] [__ PP^{at}]
(A, Th) (A$_i$, Th)

The parallelism claimed for the retroactive *–ing* morphology with passive *–en* is reinforced by the fact that both support the optional *by*-PP expression of the suppressed characteristic external argument.[11]

(31) John's toe needs [looking at e (by a competent doctor)].

With the characteristic external argument of the *–ing*-governed V taken over by *–ing* itself, anti-internalization would dictate that some other θ–role be projected externally, just as in passive.

The crucial advantage that the proposed θ–theoretical account of the retroactive nominal has over the syntactic movement account of Clark (1990) is that it requires no special 'landing site' for the kind of movement necessary in Clark's account. In the present θ–theoretical account, the retroactive nominal enters into the argument structure of the sentence in which it is found by projecting an external argument, and having that external argument satisfy the θ–criterion and projection principle requirements on its subcategorizing 'host' verb, as in (32).

(32) John's toe$_k$ needs [$_{NP}$ [$_N$ look+ing$_i$] [$_{PP}$ at e$_j$]$_j$]$_j$.
[__ NP^{ing}] [__ PP^{at}]
(A$_k$, Th$_j$) (A$_i$, Th$_j$)

A syntactic movement account of the retroactive nominal must substitute the moved PRO for a syntactic position off to the left of the Specifier of NP, as the possibility of a lexically present determiner in a retroactive nominal, for example the *a* in (35), precludes using Spec of NP as a landing site.[12]

---

[10] We allow for the possibility that there may be (some small) set of homophonous *-ing* morphemes, each with different properties (e.g., verbal *-ing*, nominal *-ing*, etc.).

[11] Alan Munn (personal communication) reports a dialect in which the retroactive nominal explicitly features what appears to be simply the passive *–en* morphology, as in (i).

i. My car needs [washed e].

These constructions of course strongly support the essential correctness of the 'passive' analysis of 'retroactive' constructions.

[12] The problem of the 'landing site' for syntactic movement for retroactive nominals perhaps arises only in a context (like that of the present paper) where a minimal NP syntax is presupposed. In theories where NPs have, say, some additional DP structure (cf. Abney (1987), Fukui & Speas (1986)), there may be ample extra syntactic positions to serve as the requisite landing sites. Such theories still must be constrained to rule out the 'subject-predicate' rules mentioned in § 5.3.

(35) John's toe needs $[_{NP}$ PRO$_i$ $[_{NP}$ $[_{Spec}$ a] $[_{N'}$ $[_{N}$ look+ing$_i$] $[_{PP}$ at e$_i$]]]].

Insofar as the extra leftward NP landing site position is motivated by nothing other than the syntactic movement analysis of the retroactive nominal, an alternative that does away with the necessity for such a position is to be preferred.

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ESCOL '91 186-197

COMPENSATORY LENGTHENING IN KOREAN REVISITED*

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I. Introduction

The purpose of the paper is to reexamine compensatory lengthening (henceforth, CL) in Korean in the framework of moraic phonology. I claim (i) that unlike Ahn's (1985) assertion, /l/-Deletion does not trigger CL but rather Intersonorant /i/-Deletion causes the preceding vowel to lengthen and (ii) that unlike Han's (1990) assertion, CL rule in Korean should be of mirror image.

Section II will discuss CL with glide formation. Section III and VI will deal with /i/-deletion and CL.

II. Glide formation and CL

In this section, I will consider CL in glide formation. Since Korean distinguishes the difference in vowel length only in the first syllable, I will examine the first syllable of words. In Korean, verb stem-final vowels /i/, /o/ and /u/ optionally undergo GF before a suffix vowel /A/[1] so that /i/ becomes /y/, while both /o/ and /u/ become /w/, as shown in (1).

```
1.   /ki - A/   ->   [ki∂] / [ky∂:]  'to crawl'
     /po - A/   ->   [poa] / [pwa:]  'to see'
     /cu - A/   ->   [cu∂] / [cw∂:]  'to give'
```

The glide formation rule in (1) can be formulated as in (2).

```
2.   Glide Formation (GF: optional)
      μ          μ
      +          |
  {[+hi, -bk]}-  A
  {[+rd]     }
```

This rule applies to /ki-A/ as shown below.

```
3.     $   $          $    $
       |   |          |    |
       μ   μ    ->    μ    μ     (GF)
      /|   |         /     |
     k i - A        k i    A
```

Accounting for CL with glide formation in (1), Han (1990) proposes that CL in Korean is a leftward spreading rule, as shown in (4).

```
4.   Compensatory Lengthening (CL)
      μ     μ
       `.   |
         `. |
          [aF]
```

But her rule cannot hold for CL caused by /i/-deletion, as will be discussed later. It will be argued that in order to accommodate CL caused by /i/-deletion, CL should be a rule of mirror image.

Now let's consider the verbs given below, which have long stem vowels. Here we can see that in spite of their long stem vowels, they surface in the same pattern as those in (1).

5. /pi: - A/ -> [pi∂] / [py∂:] 'to be empty'
/c'o: - A/ -> [c'oa] / [c'wa] 'to pick at'
/k'u: - A/ -> [k'u∂] / [k'w∂:] 'to borrow'

The examples in (5) undergo another rule which shortens a long stem vowel before a suffix beginning with a vowel. The rule applies even when a verb stem ends in a consonant (e.g., /a:n-A/ -> [ana] 'to embrace'). This shortening rule is formulated as follows.

```
6. Stem Vowel Shortening (SVS)
      μ (μ)→ϕ   μ
       \/       |
      V(C)    - V
```

In order to get correct results, SVS must be ordered before GF (S-K Kang (1989) and Han (1990)), on the contrary to Ahn (1988). Applying SVS to /c'o: - a/ before GF, for instance, produces the two correct alternates [c'oa] and [c'wa:]. If SVS is ordered after GF, however, then only [c'oa] is produced but [c'wa:] cannot.

Let's turn to the data in (7), which appear to be counterexamples to the analysis given above.

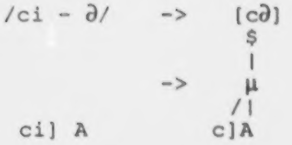
7. /ci - A/ -> [c∂] *[ci∂] *[cy∂:] 'to lose'
/c'i - A/ -> [c'∂] *[c'i∂] *[c'y∂:] 'to steam'
/c^hi - A/ -> [c^h∂] *[c^hi∂] *[c^hy∂:] 'to hit'

All the verb stems in (7) are expected to behave in the same way as those in (1). But they actually do not. In order to account for (7), Han (1990) proposes the so-called Palatal Merger given in (8).

8. Palatal Merger (PM: obligatory)
y is merged into the preceding palatal (c, c', c^h).
(Han 1990:184)

She claims that the PM applies whenever its structural description is met, even as a part of the initial syllabification. According to her, for instance, [c∂] is derived from /ci-∂/, as shown below.

9.



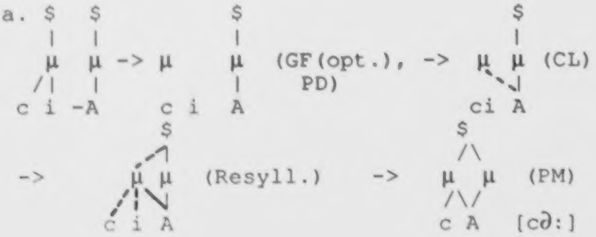
In (9), she argues, *[ci∂] cannot occur, since the palatal /c/ coalesces with /i/ unspecified for syllabicity as a part of the initial syllabification, so that GF is never involved in the derivation in (9). Her assertion, however, cannot be accepted for several reasons. First, her assertion is incorrect in that /i/ in (9) is coalesced with /c/ by PM before it undergoes GF. In (9) the stem /ci-/ does not meet the condition of PM, since only glide /y/ but not vowel /i/ is stated to coalesce with the preceding palatal consonant. Therefore, it cannot merge into /c/. Furthermore, /i/ in /ci-ta/ 'to lose' cannot coalesce with the preceding palatal consonant, so that we don't get *[cta] but rather [cida]. Additionally, unlike her assertion, her ad hoc initial syllabification, which obligatorily changes vowels /i/ and /o/ which are not preceded by a consonant into glides /y/ and /w/ respectively before a suffix vowel /A/, cannot apply to /ci-A/, for its structural description is not met. Finally and more crucially, her analysis cannot predict correct results in the following examples.

10. /ci - A/ -> [ci∂]/[c∂:] *[c∂] *[cy∂:]
'to carry something on the back'
/c^{h}i - A/ -> [c^{h}i∂]/[c^h∂:] *[c^h∂] *[c^{h}y∂:]
'to run over'

According to her analysis, we would get only the wrong outputs *[c∂] and *[c^h∂] but not the correct ones [ci∂]/[c∂:] and [c^{h}i∂]/[c^h∂:] for the forms in (10).

Turning to the analysis proposed in this paper, an explanation of the examples in (10) is straightforward. (11), for instance, shows how [ci∂] and [c∂:] are derived from /ci-∂/.

11. a.



```
b. $   $
   |   |
   μ   μ     ->   ....   (GF(opt.))
  /|   |
 c i-  A                 [ci∂]
```

As for the examples in (7), I follow H-S Kang (1987) in that the underlying vowel of the verb stems is /i/. That is, the underlying forms of [c∂], [c'∂] and [cʰ∂] are /ci-A/, /c'i-A/ and /cʰi-A/, respectively. Then the surface forms are derived from the underlying forms by the obligatory /i/-deletion rule given in (12), which will be discussed in the next section.

```
12. Obligatory /ɨ/-Deletion
     μ                           μ
     |     ->    Ø  %            |
     ɨ                ____]-N -  V
```

This rule says that /i/ obligatorily deletes with its mora either when it is followed by a suffix vowel or when it is preceded by a stem final vowel. The '-N' means that this rule does not apply to noun stems (cf. /ki-eykey/ -> [kieykey] *[key:key] 'to him'). (13), for example, shows how the rule in (12) derives [c∂] from its underlying form /ci-A/.

```
13.   $    $    $                       $
      |    |    |                       |
      μ    μ -> μ  (Obligatory ->       μ  (Resyll.)
     /|    |    |   /ɨ/-Deletion)      /|
     cɨ -  A  c A                     c A     [c∂]
```

III. CL with /i/-Deletion

In Korean, deletion of /i/ in certain cases is followed by CL. Reducing Kim-Renaud's (1974) four /i/-deletion rules into three: i.e., General (Obligatory) /i/-Deletion, Casual /i/-Deletion (Mirror Image), and Intersonorant /i/-Deletion, for example, Ahn (1985) asserts that Casual /i/-Deletion may allow an adjacent vowel to lengthen. Following Ahn, I will also formulate three types of /i/-Deletion in terms of moraic theory and show that CL may be caused by deleting /i/. First, examine the examples given below. In (14), vowel /i/ deletes when it is adjacent to another vowel. But there is no CL.

```
14. /ka - ɨni/ -> [kani] *[ka:ni] 'because (I) go'
    /s'ɨ - ɨni/ -> [s'ɨni] *[s'ɨ:ni] 'because (I)
                                     write (it)'
    /s'ɨ - A/ -> [s'∂] *[s'∂:] 'to write'
```

The /i/-Deletion phenomenon in (14) can be expressed as in (12) above. For example, (15) shows how this rule works.

```
15. /ka - ɨni/ ->   [kani] *[ka:ni]
      $   $   $                  $   $
      |   |   |                  |   |
      μ   μ   μ         ->       μ   μ  (Obl. /ɨ/-D)
     /|   |  /|                 /|  /|
     ka - ɨ n i                 ka  ni
```

It is clear from the above that Obligatory /ɨ/-Deletion does not feed CL. But observe (16), in which /ɨ/ is deleted when it is adjacent to another vowel, which gives rise to CL.

```
16. /kɨ:s - ɨni/ -> [kɨɨni]/[kɨ:ni] 'because (he)
                                         draws (a line)'
    /kɨ:s - A/ -> [kɨə]/[Kə:]  'draw (a line)'
    /t'a:h - ɨni/ -> [t'aɨni]/[t'a:ni]  'because
                               (she) braids (her hair)'
    /nah - ɨni/ -> [naɨni]/[na:ni]  'because (she)
                                    bears (a baby)'
    /noh - ɨni/ -> [noɨni]/[no:ni]  'because (he)
                                    puts (a book)'
```

The rule which deletes /ɨ/ in the examples above can be stated as in (17).

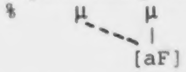
```
17. Optional /ɨ/-Deletion (Opt. /ɨ/-D)
     %    μ    μ
          |    +
       [-cons] ɨ
```

Unlike Obligatory /ɨ/-Deletion, Optional /ɨ/-Deletion is a post-lexical rule, and applies whenever and wherever the condition is met (Ahn 1985). A post-lexical rule does not obey the strict cyclicity condition, so that it applies to non-derived underlying environments as well as to derived ones. Let's consider how Optional /ɨ/-Deletion applies to derive the examples in (16). For example, /nah-ɨni/ undergoes the following derivations.

```
18. /nah - ɨni/     ->    [naɨni] / [na:ni]
      $    $  $      $    $  $
      |    |  |      |    |  |
      μ    μ  μ ->   μ    μ  μ  (/h/-D)   ->
     /|   /| /|     /|    | /|
    n a h- ɨ ni    n a -  ɨ ni   [naɨni]
      $       $                 $       $
      |       |                 | \     |
      μ    μ  μ (Opt./ɨ/-D ->   μ  μ    μ (CL)
     /|      /|   & PD)        /| /    /|
    n a      ni                n a     ni [na:ni]
```

In (18), obligatory /i/-Deletion cannot apply because it is ordered before /h/-Deletion which deletes /h/ in the so-called /h/-irregular conjugation, when followed by a vowel-initial suffix. And in order to accommodate CL in (18) we have to revise CL rule formulated in (4) as follows.

19. Compensatory Lengthening (CL: Revised)



Finally, there is another /i/-Deletion rule whereby /i/ is deleted between verb stem-final consonant /l/ and a [+sonorant] consonant, which will be discussed in the following section.

VI. /l/-Irregular Predicates and CL

This section reconsiders the so-called /l/-irregular predicates in Korean. Asserting that /nal-ini/ has two alternations, i.e. [na:ni] and [nallɨni], Kim-Renaud (1973) postulates the double /ll/ in the underlying representation of the stem, as in (20).

```
20. /nall-ɨni/ -> [na:ni]/[nallɨni] 'because (it)
                                     flies'
```

Following Kim-Renaud (1973), Ahn (1985) also claimed that the optional alternations in (20) can be solved by establishing the double /ll/ in the underlying representation of the stem. In the framework of lexical and CV phonology, Ahn (1985) derived the alternations as shown below.

```
21. a. $        $ $
      /|\       | |\
      ORC       R OR
      |||\      | ||
      CVCC      V CV Stratum 4 Inflection
      ||||      | ||
      nall      ɨ ni
     CVCC         CV
     ||||         ||
     nall         ni Intersonorant /ɨ/-Deletion
     CVC          CV
     |||          || Coda Cluster Simplification
     nal          ni(simplification of CCC sequence)
     CVC          CV
     ||/          || /l/-Deletion & association of
     na           ni /a/ to the empty C
     [na:ni]
```

```
b.CVCC        VCV Stratum 4 Inflection
  ||||        |||
  nall        ɨni
  ................Intersonorant /ɨ/-Del.(opt.)
  CVC        CVCV
  |||        ||||
  nal        lɨni Resyllabification
  ................Coda Cluster Simplification
  [nallɨni]
```

He claims that in this way, the two alternations, i.e. [na:ni] and [nallɨni], can be explained correctly and that the compensatory lengthening in (21) can be given a natural account. As Kang (1991a) points out, however, [na:ni] and [nallɨni] should be derived from different underlying forms, i.e. the former is derived from /nal-ini/ and the latter from /nalli-ini/. In (21), besides, CL allows the preceding vowel /a/ to lengthen, which gives an awkward representation of a long vowel as a vowel melody linked to VC rather than VV (Hayes 1989). Furthermore, his assertion that /l/-deletion triggers CL is not independently motivated in Korean. In fact, (22) shows that no CL is caused by /l/-deletion.

22. a. /pul-napi/ -> [punabi]/[pullabi]'toger moth'
/pul-sap/ -> [pusap] 'fire shovel'
/pul-cipke/ -> [pujipk'e] 'fire nippers'
/pətɨl-namu/ -> [pədɨnamu] 'willow tree'
/c^hal-tol/ -> [c^hadol] 'quart'
b. /nal-nal-i/ -> [nanari] 'day after day'
/tal-tal-i/ -> [tadari] 'every month'
/cal-cal-ha-n/ -> [cajalhan] 'very small'
c. /pul-cəncik/ -> [pujəncik] 'dishonest'
/pul-tan-han/ -> [pudanhan] 'unreasonable'
d. /ul-ni/ -> [uni] '(Do you) cry?'
/p^hal-ni/ -> [p^hani] '(Do you) sell?'

No CL with /l/-deletion in (22) can be given a natural account if we render /l/ as a nonmoraic segment. That is, deletion of /l/ has no mora stranded, so that no CL takes place. [uni], for instance, is derived from its underlying form /ul-ni/, as shown below.

```
23.  $     $         $     $
     |     |         |     |
     μ     μ   ->    μ     μ   (/l/-Del.)
     |\   /|         |    /|
     ul - ni         u  - ni
```

As will be discussed later, not /l/-deletion but Intersonorant /ɨ/-Deletion triggers CL in (21a).

In what follows, I will reconsider the problem in question in the framework of moraic theory. Let's observe some other examples relevant to the problem, given in (24).

24. a. [nal - ta] 'to fly'
[narasə], [narɨni]/[na:ni], *[nallasə], *[nallɨni]
a'. [narɨ - ta] 'to carry'
[nallasə], [nallɨni]/[narɨni], *[na:ni], *[narasə]
b. [kil - ta] 'to be long'
[kirəsə], [kirɨni]/[ki:ni], *[killəsə], *[killɨni]
b'. [kirɨ - ta] 'to breed'
[killəsə], [killɨni]/[kirɨni], *[ki:ni], *[kirəsə]

The verb stems in (24a, b) end with /l/, i.e. /nal-/ and /kil-/, while those in (24a', b') end in vowel /ɨ/, i.e. /nalɨ-/ and /kilɨ-/. The former work differently from the latter in several respects. First, the former allow only one /l/ in their alternations as in [kirəsə] and no double /ll/ as in *[killəsə] in (24b), whereas the latter have the double /ll/ when they are followed by suffixes beginning with a vowel as in [killəsə] in (24b'). Secondly, the former optionally undergo CL (e.g., /kil-ɨni/ -> /kil-ni/ (Intersonorant /ɨ/-Deletion) -> [ki:ni] (/l/-Deletion and CL)), but the latter do not (i.e., *[ki:ni]). As shown in (24a, a'), we can conclude that [nallɨni] and [na:ni] are not two alternants of one word but two different words. That is, [nallɨni] has the meaning of 'because (we) carry (it)', whereas [na:ni] means 'because (it) flies'. Therefore, the assertion is incorrect that /nal-ɨni/ 'because (it) flies' has two alternants, i.e. [na:ni] and [nallɨni].

Now let's turn to an account of the alternations in terms of the moraic theory. To begin with, consider the alternations in (24a, b). In order to account for them, I will posit only one /l/ in their stems underlyingly. The stem of the verb in (24b), for instance, is underlyingly represented as follows.

```
25. /kil-/
      μ
      |
    k i l-
```

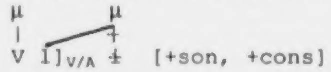
Following Park (1990), here, I assume that initial syllabification takes place at the end of the word cycle, for a verb stem, being a bound morpheme, in Korean cannot be used alone. Given this assumption, CL with Intersonorant /ɨ/-Deletion can be given a natural account in the framework of moraic phonology. (26) shows how the alternations in (24b) are derived.

```
26. a. [kirɨni]      'because (it) is long'
          $    $  $
          |    |  |
          μ    μ  μ (Syll.) -> ...... (Intersonorant
         /|   /| /|            /ɨ/-Deletion (opt.))
        k i  l-ɨ ni
                [kirɨni]

    b. [ki:ni]   'because (it) is long'
          $    $  $           $      $
          |    |  |           |      |
          μ    μ  μ   ->    μ μ      μ (Intersonorant
         /|   /| /|         /|      /| /ɨ/-Deletion &
        k i  l-ɨ ni        k i l-  ni  PD)
          $       $
          | \     |
     ->   μ   μ   μ (CL & /l/-Deletion)
         /|  /   /|
        k i  -   ni       [ki:ni]
```

Intersonorant /i/-Deletion and /l/-Deletion in (26) can be formulated as in (27a, b), respectively.

27. a. Intersonorant /ɨ/-Deletion (optional)



```
    b. /l/-Deletion
           /l/   ->    Ø / ___]V/A {s, n}
```

Rule (27a) says that the suffix-initial /i/ deletes between the stem final /l/ and [+son] consonants. And when a stem-final /l/ is followed by an affix-initial /s/ or /n/, it is deleted obligatorily by (27b) (e.g., /til-se/ -> [tise] 'let's eat', /h∂l-ni/ -> [h∂ni] '(Do you) destroy (it)?'). Unlike the CV theory, the moraic theory derives the alternations in (24) without producing an awkward representation to link a vowel to a C slot, as shown above. In addition, it has been shown in (26b) that not /l/-deletion but Intersonorant /i/-Deletion causes the preceding vowel to lengthen. The pattern here is 'VCV -> V:CØ'; that is, a vowel is dropped with CL of the vowel of the preceding syllabie. CV phonology cannot give a natural account of how this can take place.

```
28. /kil-ɨni/ -> [kirɨni]/[ki:ni] 'because (it) is
                                   long'
     $    $$
    /|\   ||\
    ORC   ROR
    |||   |||
    CVC   VCV   -> CVC    VCV
    |||   |||      |||     || (Intersonorant /ɨ/-Del.
    kil  -ɨni      kil     ni  (optional))
    CVC   VCV             CVVCV
    |L+---  || (CL) ->    ||/|| (/l/-Deletion)
    kil    ni             ki ni    [ki:ni]
```

The CL formulation in (28) above would raise eyebrows, for we wind up with crossing association lines. An alternative mechanism of CV phonology is some kind of double flop, which will generate an empty slot for the vowel /a/ to spread onto.

```
29.  CVC   VCV          ->    CVC    VCV
     |||   |||                |||     || (Intersonorant
     kil  -ɨni [kirɨni]       kil     ni /ɨ/-Del.(opt.))
           CVCVCV                   CVCVCV
     ->    || /|| (Flop) ->         ||/||| (Spreading)
           kil ni                   ki lni
           CVCCV
     ->    ||/|| (/l/-Deletion)
           ki ni         [ki:ni]
```

In (29), the consonant /l/ must flop onto a vowel position. Then this unprecedented reassociation is followed by spreading of the vowel /a/ onto the vacated C position. To make the representations above look reasonable, we might need some kind of relabeling convention, which will adjust C and V to fit the melodic positions associated with them. But the relabeling convention is not supported by any empirical evidence (Hayes 1989).

For the verbs in (24a', b'), the double /ll/ is posited in their underlying representations. Compared with /kil-/ in (25), for example, the underlying representation of /killi-/ is given in (30).

```
30. /killɨ-/    'to breed'
     μμ μ
     || | -
    kil ɨ
```

[kirini] and [killini] 'because (we) breed (it)', for instance, are derived as in (31a) and (31b), respectively.

```
31. a. [kirɨni]   'because (we) breed (it)'
        $  $    $  $            $  $    $
        |\ |    |  |            |\ |    |
        μμ μ    μ  μ (Syll.)->  μμ μ    μ (Obl./ɨ/-Del.)
        /||/| - | /|            /||/|- /|
        kil ɨ   ɨ ni          k il ɨ   ni
         ->  ....... (Intersonorant /ɨ/-Del.(opt.))
               $  $      $
               |  |      |
         ->    μ  μ      μ   (/l/-Degemination(opt.))
              /| /| -   /|
              kil ɨ     ni            [kirɨni]

       b. [killɨni]  'because (we) breed (it)'
        $  $    $  $             $  $    $
        |\ |    |  |             |\ |    |
        μμ μ    μ  μ (Syll.) ->  μμ μ    μ (Obl./ɨ/-
        /||/| - | /|             /||/|- /|    Del.)
        kil ɨ   ɨ ni             kil ɨ  ni
         ->  ....... (Intersonorant /ɨ/-Del.(opt.))
         ->  ....... (/l/-Degemination(opt.))
         [killɨni]
```

In (31), vowel /i/ deletes when it is adjacent to another vowel. But there is no CL, which is predicted by Obligatory /i/-Deletion in (12). And the Intersonorant /i/-Deletion cannot apply, because its structural description is not met, which is predicted by the following constraint proposed by Hayes (1986).

32. Linking Constraint

Association lines in structural descriptions are interpreted as exhaustive.

The linking constraint above says that if structures have more association lines than the rule requires, then these structures will not meet the structural description of the rule, for association lines are interpreted as exhaustive. Since the geminate /l/ in (31) is represented as linked to two different prosodic tiers rather than one required by the Intersonorant /i/-Deletion, the structural description of the Intersonorant /i/-Deletion is not met here. And the geminate /l/ in (31) optionally undergoes the /l/-Degemination rule. This rule can be formulated as follows.

```
33. /l/-Degemination (optional)
     ø←(μ) μ
         \/|
         l ɨ
```

In (33), the geminate liquid /l/ loses its mora by degemination.

V. Conclusion

To sum up, I have asserted above that unlike Ahn's (1985) assertion, CL in Korean is not triggered by /l/-Deletion but rather by Intersonorant /i/-Deletion, and that unlike Han's (1990) assertion, CL rule in Korean should be of mirror image.

FOOTNOTES

* I am very grateful to Chin-W.. Kim, Charles W. Kisseberth, José I. Hualde and Jennifer Cole for comments and suggestions. I am, of course, solely responsible for remaining perversities.

1. Suffix vowel /A/ is realized as [a] when the final stem vowel is [a] or [o]. In other cases, it is realized as [ə].

2. The output of the Glide Formation rule is immediately submitted to Parasitic Delinking given below.

(i) Parasitic Delinking (PD)
Onset consonants are desyllabified if their syllable contains no overt moraic nucleus. (Hayes 1989)

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ESCOL '91 198-209

A CLASSIFICATION OF VSO LANGUAGES

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The question of how to analyze VSO languages has been of particular interest in recent years with the development of a theory of verb movement. For example, Sproat (1985) argues that VSO languages are underlyingly SVO, with the VSO order achieved through a verb fronting rule. More specifically, I(NFL) raises to the left of the subject NP, and then either the verb raises and becomes in some sense attached to I, or an auxiliary is inserted there, resulting in VSO order (Sproat, 1985: 202).

However, another line of analysis has been proposed recently, in which null expletive subjects play a crucial role in VSO structure.

Mohammad (1988: 250), for example, argues that Arabic, a language which has both VSO and SVO structures, is actually entirely SVO. His main argument is based on the fact that when VSO order occurs in Arabic, the verb always shows third person singular agreement, even if the subject is not third person singular; however, when SVO order occurs, the verb agrees with the subject. This can be seen in the following examples (Mohammad, 1988: 251):

(1) a. jaa?a l-walad-u w-al-bent-u
came 3sm the-boy-NOM and-the-girl-NOM
'The boy and the girl came.'

b. ?al-walad-u w-al-bent-u jaa?aa
the-boy-NOM and-the-girl-NOM came 3dm

c.*jaa?aa l-walad-u w-al-bent-u
came 3dm the-boy-NOM and-the-girl-NOM

d.*?al-walad-u w-al-bent-u jaa?a
the-boy-NOM and-the-girl-NOM came 3sm

Mohammad explains these facts as follows: in the cases which appear to be VSO, the verb does not agree with what is understood to be the subject of the sentence, but with a null expletive subject in Spec,IP (Mohammad, 1988: 250). He argues that the thematic--postverbal--subject remains in Spec,VP, where it is base-generated (Mohammad, 1988: 250). It is in this position, moreover, where the thematic subject receives overt nominative Case, as we can see in (1)a., where the nominative marker -*u* shows up on both of the conjoined subjects, *walad* 'boy' and *bent* 'girl'.

Another of the null expletive analyses is found in

Shlonsky (1989), who tentatively proposes an analysis for VSO languages based on his work on inversion constructions in Hebrew and Spanish, where he claims that certain inversion constructions in Hebrew and Spanish--most specifically what is referred to as free inversion--can be accounted for by adjoining the subject to VP, either to the right or to the left depending on the language (1989: 74-75). With respect to VSO languages, he suggests (1989: 114) that the structure is [pro$_i$-V-S$_i$-O]; the subject adjoins to the left of the VP, and the verb raises to I. Shlonsky proposes that assuming subject adjunction to VP will account for the claim that subjects in VSO languages are properly governed (as proposed for Chamorro by Chung (1983)), as this is a characteristic of VP-adjoined subjects in Romance languages which allow null subjects (1989: 115). This, he says, will also account for pro-drop in VSO languages (1989: 115). Finally, this analysis will allow us to continue with the hypothesis that VSO structure is derived from underlying SVO structure, but associating this with Romance-type free inversion as opposed to Germanic-type verb raising, as in, e.g. Sproat (1985) (Shlonsky, 1989: 115).

However, Shlonsky's analysis is not completely compatible with Mohammad's. Shlonsky assumes (1989: ch.2) that null expletives are coindexed with an argument that will replace them at LF to satisfy, e.g., the ECP. So, in his analysis of VSO languages, the null expletive is coindexed with the postverbal subject. Mohammad, recall, argues that it is the null expletive subject in Spec,IP which triggers the third person singular agreement on the verb. Shlonsky's proposal permitting the null expletive to be coindexed with the VP-internal subject would mean that ultimately it could be the latter which controlled agreement, and, as we have seen, this is not the case in--at least--Arabic.

In this paper, I would first like to extend Mohammad's analysis to explain the full structure in what I shall call "pseudo" VSO structures ("pseudo" referring to the situation where the "real" subject is a preverbal null expletive), with respect, in particular, to how to represent the postverbal subject structurally, and how to assign it nominative Case.

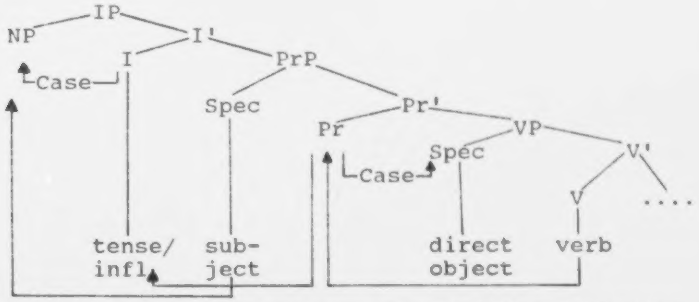
I will then extend the whole analysis to Welsh, Breton, Berber and Biblical Hebrew, arguing that Arabic is not the only pseudo VSO language. Berber and Biblical Hebrew, in addition, provide evidence that we can divide pseudo VSO languages into two classes depending on where AGR is realized. I will finally suggest that there is a class of "true" VSO languages, represented here by Malayo-Polynesian languages.

The analysis I would like to propose is as follows. I will assume, following Mohammad's analysis, that the actual subject in a VSO construction is a null expletive which is base-generated in Spec,IP. However, my proposal for how to treat the relationship between the verb and the postverbal subject--i.e. where exactly this subject is located--differs from Mohammad's. As mentioned above, Mohammad claims that the postverbal subject is base-generated in Spec,VP, and stays there (Mohammad, 1988: 250). The verb then raises to I, resulting in VSO order (Mohammad, to appear; as referred to in Koopman and Sportiche, 1988: 10).

What I would like to propose, however, is that (following Bowers, 1988) there is another layer of structure between I' and VP--a functional projection called PrP (Predicate Phrase). The subject originates in Spec,PrP, and the direct object (if there is one) is considered a secondary subject and is base-generated in Spec,VP (Bowers, 1988: 13). In an SVO construction, the subject would raise from Spec,PrP to Spec,IP to get Case. The verb raises from V to Pr, where it can Case-mark the direct object, and then raises to I to get agreement with the element in Spec,IP, unless there is an auxiliary element present in I, in which case that gets the agreement and inflection features, and the verb stays in Pr (roughly following Bowers, 1988: 19).

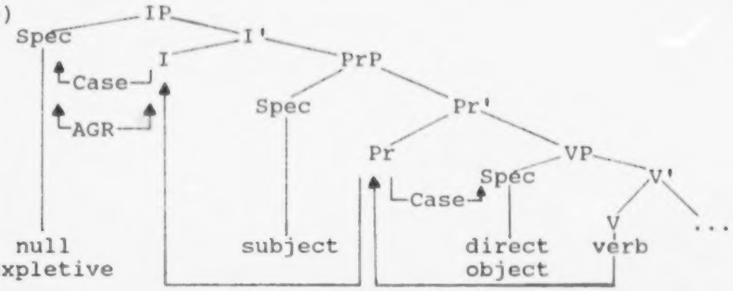
We thus obtain the following SVO structure:

(2)



In VSO structures, however, we find the following situation. The null expletive subject is base-generated in Spec,IP, which prevents the subject in Spec,PrP from raising. The verb raises to Pr and Case-marks the direct object and then raises to I, where agreement takes place between the verb and the element in Spec,IP:

(3)



There are two further issues here that I would like to consider now. The first is how the postverbal subject gets Nominative Case. We have evidence from Arabic (see (1)a.) that this is what happens, due to the overt Nominative Case, and we will assume from the Arabic facts that this is also the case in other pseudo VSO languages, though they do not all have overt Case-marking. The solution I propose is that Nominative Case is assigned to the postverbal subject through an ECM-type mechanism which permits I to Case-mark Spec,PrP.

The other point I would like to bring up is that pseudo VSO languages can have null pronominal subjects (pro), and when they do, that is what the verb agrees with; examples of this are as follows:

(4) a. yuhibbu:na anfusahum
like 3pl themselves
'They like themselves.'
ARABIC

b. gwelais y ci
saw-1sg the dog
'I saw the dog.'
WELSH (Awbery, 1976: 9)

c. levriou a lennan
books Pcl read-1sg
'I read books.'
BRETON (Stump, 1984: 290)[1]

d. t-ttcu iselman
3fs-ate fish
'She ate fish.'
BERBER (Choe, 1987: 125)

e. va-yavi'u oto el-ohel mo'ed
and-brought 3pl it to-the-tent meeting
'and they brought it to the Tent of Meeting'
BIBLICAL HEBREW (Old Testament, Numbers 31:54)

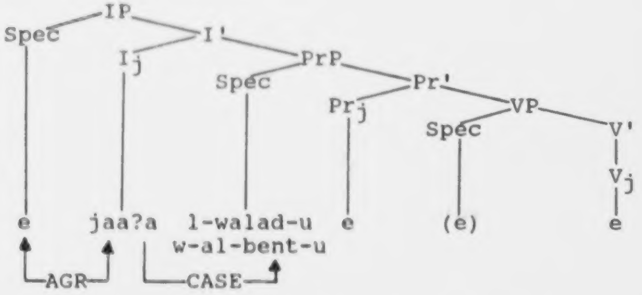
Given the above analysis--i.e. that VSO constructions have a null expletive in Spec,IP which the verb agrees with, and that SVO constructions have an overt subject in Spec,IP which the verb agrees with--and these facts, we can draw the descriptive generalization that in pseudo VSO languages, the verb must agree with some preverbal nominal element, whether or not this element is null.

From this, we assume that pro appears only in Spec,IP, and not Spec,PrP, since if it were base-generated in Spec,PrP and moved to Spec,IP, there would presumably be the possibility of getting a VSO construction with the postverbal subject null, and the verb agreeing with a null expletive in Spec,IP, and this does not happen. The question remains, however, as to why this is the case. A possible solution to this can be found in the notion of identification (Stowell, 1981); that is, pro must be identified by 'sufficiently rich' agreement (Taraldsen, 1978). Since agreement is realized on I, not V, pro shows up in Spec,IP. (This will need to be slightly revised for Berber and Biblical Hebrew, as will be discussed later, but not in such a way as to be disruptive to this analysis.)

Having considered the details of the analysis, I now turn to an application of the analysis to the various languages mentioned above--Arabic, Welsh, Breton, Berber and Biblical Hebrew.

The Arabic example in (1)a. will have the following structure:

(5)



Welsh is also pseudo VSO, as we can see in the following examples:

(6) a. Gwelodd y dynion y ci.
saw 3sg the men the dog
'The men saw the dog.'

b.*Gwelsant y dynion y ci.
saw 3pl the men the dog
(Awbery, 1976: 7)

The verb must show third singular agreement here, although the subject, y dynion, is third plural. This will work like the Arabic example presented just above in (5).

Welsh, however, has the peculiarity that in cases where there is an overt pronoun in VSO structures, there is agreement between the verb and the postverbal subject, contrary to what one might expect:

(7) a. Gwelais i y ci.
saw 1sg I the dog
'I saw the dog.'

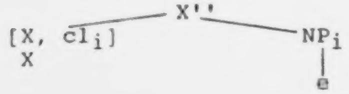
b. Gwelodd ef y ci.
saw 3sg he the dog
'He saw the dog.'

c. Gwelsant hwy y ci.
saw 3pl they the dog
'They saw the dog.'
(Awbery, 1976: 7)

This is explained by the fact that the pronouns involved here are clitics,[2] and that this is what results in the agreement with the verb.

Borer (1983) proposes a base-generated (as opposed to movement) approach to clitics. She assumes a structure like (1983: 35):

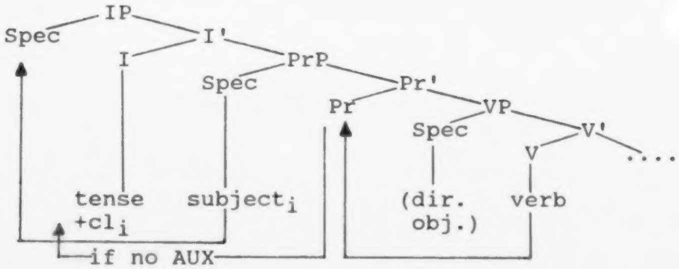
(8)



where the clitic governs the coindexed NP (1983: 35).

I assume, as above, that V raises to Pred, and then to I if there is no AUX present. Following Borer, I assume that the clitic pronoun is base-generated in I and absorbs the Nominative Case that would otherwise have gone to the subject in Spec,PrP; as a result of this, the subject NP cannot be overt (Borer, 1983). The subject NP can, however, be pro, but it can't remain in Spec,PrP, since pro must be identified through Spec-Head agreement, so it raises to Spec,IP:

(9)



Finally, since there is base-generated coindexing between the clitic in I and the subject in Spec,PrP, this forces agreement between the clitic and the verb.

Examples from Breton show us that it is yet another pseudo VSO language, as in:

(10) Levriou a lenn (*lennont) ar vugale.
books Pcl read [3sg] (*read-3pl) the children
'The children read books.'
(Stump, 1984: 292; brackets mine)

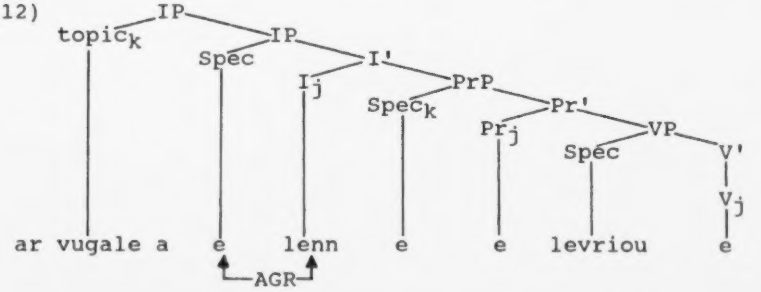
The particular feature of note in Breton is the particle a, which we see here, and also in the previous Breton example, (4)c. This particle is a topic marker, as argued in Anderson and Chung (1977), and as can be seen in the distribution of agreement facts--i.e., we find examples both where the object in Spec,VP is topicalized and where the subject in Spec,PrP is topicalized:

(11) a. Levriou a lenn ar vugale
books Pcl read 3sg the children
'The children read books.'

b. Ar vugale a lenn levriou
the children Pcl read 3sg books
'The children read books.'
(Stump, 1984: 290-292)

In addition, the example here with the subject in Spec,PrP topicalized shows that the verb does not agree with the topic, since the topic is third plural and the verb shows third singular agreement. I propose that this is exactly like the ordinary pseudo VSO situation with a null expletive in Spec,IP, and that the topic is adjoined to IP:

(12)



Similarly, in sentences with null pronominal subjects, like (4)c. above, the topic is adjoined to IP, and the verb agrees with pro in Spec,IP.

Breton also exhibits the same clitic phenomenon as Welsh:

(13) Levriou a lennan-me
books Pcl read-1sg-clitic
'I read books.'
(Stump, 1984: 302)

This is analyzed in the same way as the Welsh examples presented above.

I would next like to consider Berber, which differs from the pseudo VSO languages presented so far, in that there is agreement between the verb and the postverbal subject, as in:[3]

(14) a. t- ttcu Tifa iselman
3fs-ate name fish
'Tifa ate fish.'

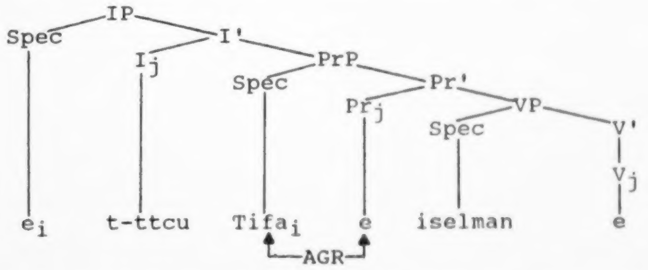
b. Y- uzn Mohand tabratt i Tifa
3ms-sent name letter to name
'Mohand sent a letter to Tifa.'
(Choe, 1987: 124-5)

Choe (1987) argues that a verb (or INFL) raising analysis such as that proposed by Sproat (1985) will not work for Berber; she instead argues for an approach in which the subject adjoins to either V or INFL (1987: 123). In addition, AGR is realized within VP, with the combination V + AGR assigning Nominative Case (1987: 123).

I propose a revision of Choe's analysis in light of the analysis presented above. Let us assume that in Berber, AGR is realized on PrP rather than INFL, and agreement is between Spec,PrP and Pr. There is a null expletive in Spec,IP and a subject in Spec,PrP, but they are coindexed (following Shlonsky) because agreement is realized within PrP. The verb raises to Pr, and we get Spec-Head agreement, and finally the verb raises to I (this is proposed because there are never any overt preverbal elements in Berber).

The example in (14)a. thus looks like:

(15)



Note that because of the location of agreement in Berber, we will need to say that pro in Berber appears in Spec,PrP.

Biblical Hebrew falls into the same class of pseudo VSO languages as Berber:[4]

(16) ko asu avotexem
thus do-past-3pl fathers-your
'Thus did your fathers....'
(Old Testament, Numbers 32:8)

The analysis for Biblical Hebrew will thus be the same as for Berber.[5]

We can now completely unify the account of VSO languages that we have been presenting thus far: pseudo VSO structures have null expletives in Spec,IP position, and also an overt subject in Spec,PrP. The differences in agreement facts are determined by whether (1) AGR is realized on INFL (e.g., Arabic, Welsh, Breton), in which case agreement is between the null expletive and the verb; or (2) AGR is realized on PredP (e.g., Berber, Biblical Hebrew), in which case agreement is between the subject in Spec,PrP (which is coindexed with the null expletive in Spec,IP) and the verb.

Finally, I would like to tentatively propose that there is also a class of true VSO languages, an example of which can be found in Malayo-Polynesian verb-initial languages. These languages have topic agreement on the verb, as can be seen in the following examples from Tagalog (Schachter, 1976: 494-495); A=actor, G=goal, D=direction, B=beneficiary, T=topic:

(17) a. Mag-salis ang-babae ng bigas sa sako
AT-will-take-out T-woman G-rice D-sack

para sa bata.
B-child

'The woman will take some rice out of a/the sack for a/the child.'

b. Aalisin ng babae ang bigas sa sako
GT-will-take-out A-woman T-rice D-sack

para sa bata.
B-child

'A/The woman will take the rice out of a/the sack for a/the child.'

c. Aalisan ng babae ng bigas ang sako
DT-will-take-out A-woman G-rice T-sack

para sa bata.
B-child

'A/The woman will take some rice out of the sack for a/the child.'

d. Ipag-salis ng babae ng bigas sa sako ang
BT-will-take-out A-woman G-rice D-sack T-

bata.
child

'A/The woman will take some rice out of a/the sack for the child.'

Travis and Williams (1984) point out that this topic agreement process is restricted to the arguments of a given verb (1984: 3); i.e., a verb cannot be marked to agree with a topic in another clause. Furthermore, there can only be one topic, which Travis and Williams account for by proposing that the topic is an external argument, and a verb can only have one external argument (1984: 6).

What I would like to suggest is that AGR in these languages is realized on PrP, as in Berber. The topic originates in Spec,PrP, and the verb moves to Pr so that Spec-Head agreement can take place. The verb then raises to I (there are generally no overt preverbal elements, at least not verbal ones, which would be expected to show up in I), and the topic/subject moves to wherever in the sentence its ultimate location will be.

A possible reason for not assuming, as in Berber, a null expletive subject in Spec,IP coindexed with the element in Spec,PrP, is that in Malayo-Polynesian languages the element in Spec,PrP is not necessarily the understood subject of the sentence, and so it is not clear that it should be coindexed with an element that is more obviously subject-like.

To sum up, then, we have seen that we can distinguish at least a class of pseudo VSO languages, which are languages which have a null expletive subject in Spec,IP in VSO constructions; in addition, this class may be further broken down into two subclasses depending on where agreement is realized. There also may be a class of true VSO languages, which do not have a null expletive in Spec,IP. The differences between these types of VSO languages can apparently be explained by structural analyses of the languages involved.

FOOTNOTES

*Many thanks to John Whitman, Wayne Harbert and Michael Bernstein for comments and discussion.

1. *a* is a topic marker, and will be discussed in more detail later.

2. Sadler (1988: 70) discusses the Welsh pronominal system, and argues that subject pronouns in tensed clauses are clitics.

3. Note that we also find sentences like:

Y-ssen	wryaz	d	temttutt	d	wryaz	i	Tmazight.
3ms-know	man	and	woman	and	man	to	Berber

'The man, the woman, and the man know Berber.'
(Choe, 1987: 135)

Because there is agreement elsewhere, I am going to follow Choe's analysis (1987: 135) and assume that the agreement facts here are due to the verb agreeing with the first element in the conjoined structure.

4. Biblical Hebrew exhibits the same phenomenon as Berber with respect to conjoined structures. I assume the same analysis as for Berber to account for this.

5. It would be interesting to pursue research in how this difference between Arabic and Biblical Hebrew--i.e. the difference in where AGR is realized--carries over into other structures in the languages.

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ESCOL '91 210-221

STRESS AND ACCENT IN ABKHAZ*

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0. Introduction

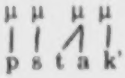
Abkhaz, a Northwest Caucasian language spoken by some 70,000 people, presents many challenges for phonologists and phoneticians. Like the other languages of the Northwest Caucasian group, Abkhaz has a large number of distinctive consonants (59 in the literary language, more in some dialects) and a small number of distinctive vowels (generally said to be two, though some have suggested (e.g. Allen 1965) that there may be only one). Of more interest to phonologists, however, is the highly unusual stress system of Abkhaz, documented in admirable detail by Spruit (1985). At first glance Abkhaz stress appears chaotic and unpredictable, but Spruit shows that there is indeed a system, involving an opposition between what he calls "dominant" and "recessive" syllables. Although Spruit's account is largely atheoretical, the facts can be described quite easily in grid-based metrical phonology; Spruit's dominant-recessive opposition translates into lexically accented (having both a Line 0 and a Line 1 asterisk) vs. unaccented (having only a Line 0 asterisk). In addition, there are a number of significant benefits to using the grid-based formalism: (1) Stress can be assigned with two common, universal rules rather than with the language-specific rule used by Spruit; (2) So-called "irrational" schwas can be easily accounted for with rules which are independently needed; and (3) Two morphemes which are noted as exceptions by Spruit can be accomodated straightforwardly if we allow two additional accent types: stressed (i.e. having three asterisks in the lexical entry) and extrametrical (having no asterisk).

1. Some brief background

Phonetically, Abkhaz has roughly seven different vowels, but these can be reduced to only two distinctive vowels, commonly written as /a/ and /ə/ (Hewitt 1979, Spruit 1985). Furthermore, it turns out that the appearance of schwa is to a very large extent predictable, so that there may be only a single underlying vowel (/a/) in Abkhaz, with schwa only being inserted by phonological rules. Spruit (1985) differentiates between "automatic" and "nonautomatic" occurences of schwa; the difference is, roughly, that the appearance of automatic schwa is conditioned by the phonetic environment, while nonautomatic schwa is not. For example, (automatic) schwa can often serve to break up consonant clusters; in such cases the schwa is usually optional to some degree, and various phonetic factors (such as the sonority of the consonants involved) influence how likely it is to appear and where in a cluster it will surface if it does appear. I will have little more to say about automatic schwa, but I assume that it is essentially a phonetic phenomenon, inserted late in the derivation by some kind of rule which is sensitive to the phonetic nature of the surrounding consonants[1]. (In order to simplify matters, none of the Abkhaz words in this paper will contain automatic schwas.)

In contrast, so-called "nonautomatic" schwa is mandatory, and the phonetic nature of surrounding consonants has no bearing on its appearance. Rather, nonautomatic schwa appears, for the most part, under stress (with some exceptions to be noted later); to fully understand just when it appears, we need to know a few basic facts about the Abkhaz stress system. First of all, the potential stress-bearing units in Abkhaz are not syllables, but what Spruit (1985) calls "elements". I will refer to them as moras, since they correspond closely to the definition of mora often used in metrical phonology (for instance in Hyman (1985), Hayes (1989), and Bagemihl (1991)): an onset (i.e. any consonant immediately followed by a vowel) forms a mora with the following vowel, while any consonant which is not immediately followed by a vowel (or a vowel which is not preceded by a consonant) is considered a separate mora.[2] Thus the word *pstak'* ('a ravine'), which would contain a single syllable under most definitions, consists of four moras -- *p*, *s*, *ta*, and *k'* -- as shown in (1) below:

1)



Notice that moras can consist of single consonants; if the stress falls on one of these consonantal moras, a schwa is inserted to take the phonetic stress. For example, note that the morphemes meaning "head" and "meat" contain a schwa when they are stressed, but not when the stress appears elsewhere:[3]

2) a. a-xə́ 'the head'
b. a-z^{w}ə́ 'the meat'
3) a. a-x-k^{w}á 'the heads'
b. a-z^{w}-k^{w}á 'the meats'

I assume that these morphemes are underlyingly *x* and *z*^{w} respectively, and that the schwas in (2) are inserted by a rule tied somehow to the one assigning stress (in a way we will see later). This allows a parallel treatment of automatic and nonautomatic schwa, with neither being present in underlying representations.

2. The Abkhaz stress system

Abkhaz has only one stress per word, and this stress can fall initially, finally, or anywhere in between. There are numerous minimal pairs which differ only in the position of the stress:

4) a. a-lá 'the dog'
b. a-x-k^{w}á 'the heads'
c. a-pa-rá 'to pleat'
d. á-la 'the eye'
e. á-x-k^{w}a 'the sediments'
f. á-pa-ra 'to jump'

Words containing the same root can differ significantly in stress placement, as the examples in (5) demonstrate. In most cases the stress is fixed in a given word, but there are a few words where there is free variation between two possible stress positions (as in 5g below):

5) a. a-lá 'the dog'
b. a-la-k^{w}á 'the dogs'
c. y^w-lá-k' 'two dogs'
d. á-y^w-la-k' 'the two dogs'
e. á-la 'the eye'
f. á-la-k^{w}a 'the eyes'
g. y^w-lá-k' / y^w-la-k'ə́ 'two eyes'
h. á-y^w-la-k' 'the two eyes'

At first glance, there appears to be no rhyme or reason to this shifting of stress, but Spruit (1985) shows that there is indeed a system involved. Each mora of each morpheme can be put into one of two classes, which Spruit calls "dominant" and "recessive". This classification is independent of phonetic shape, so two morphemes can be identical segmentally but differ in stress class; thus *la* means 'dog' when dominant, but 'eye' when recessive.[4] Once we know the stress class of all the moras in a word, the following rule determines stress placement:

6) Stress falls on the first (i.e. leftmost) dominant mora which is not immediately followed by another dominant mora.

This rule accounts for the stress in (almost) all the examples we have seen so far. The words in (5) are repeated below, with stress class (D for dominant, R for recessive) indicated below each mora:

7) a. a-lá 'the dog'
D D
b. a-la-k^{w}á 'the dogs'
D D D
c. y^w-lá-k' 'two dogs'
R D R
d. á-y^w-la-k' 'the two dogs'
D R D R
e. á-la 'the eye'
D R
f. á-la-k^{w}a 'the eyes'
D R D
g. y^w-lá-k' / y^w-la-k'ə́ 'two eyes'
R R R R R R
h. á-y^w-la-k' 'the two eyes'
D R R R

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Note that when a word consists entirely of recessive moras, as in (7g), the stress can fall on either of the final two moras, with the two forms being in free variation. (Actually, this is only true of nominal forms; verbs with no dominant mora follow different rules.) Also note that when the stress falls on a mora consisting of a consonant (as in the second variant in 7g), a schwa is inserted to take the phonetic stress, as we noted earlier.

The above system can be translated fairly easily into the more familiar formalism of metrical phonology, and we will see below that there are benefits to the switch. Spruit's dominant vs. recessive opposition corresponds to inherently accented vs. unaccented syllables in languages like Vedic and Russian (Halle and Kiparsky 1977), or in some Bantu languages such as Tonga (Goldsmith 1982)[5]. In Vedic, for example, each syllable is lexically specified as either accented or unaccented, and stress goes on the leftmost accented vowel (cf. our Rule 6 above); in Tonga, accent is relevant for the placement of tones. As Prince (1983) points out, such lexical accent can be represented in grid-based metrical phonology by saying that accented syllables have both a Line 0 and a Line 1 asterisk in their lexical entries, while unaccented syllables have only a Line 0 asterisk. In Abkhaz it is moras rather than syllables which are represented in the metrical grid, but the same basic principle applies. Thus, in their underlying forms, the Abkhaz words *a-la-k^{w}á* 'the dogs' and *á-la-k^{w}a* 'the eyes' would have the following metrical grids:

```
         *  *  *                    *     *         Line 1
         *  *  *                    *  *  *         Line 0
    8) a. a-la-kʷa  'the dogs'   b. a-la-kʷa  'the eyes'
```

We next need to assign the stress, represented as a Line 2 asterisk. One alternative would be to simply translate our Rule 6 into the new notation:

9) Place a Line 2 asterisk over the leftmost Line 1 asterisk which
is not immediately followed by another Line 1 asterisk.

However, this is not a very satisfying solution. Rule 9 is distressingly ad hoc, not the type of rule one normally finds in metrical phonology, and there seems to be no reason to prefer it over Rule 6. A more promising alternative is to break the process down into two rules, one to eliminate irrelevant accents and the other to assign stress[6]:

10) * ---> ø / ___ * Line 1

11) Place a Line 2 asterisk over the leftmost Line 1 asterisk.

Rule 10 deletes any Line 1 asterisk which is immediately followed by another Line 1 asterisk; it is assumed to apply as many times as it can in a word, so that in a sequence of three consecutive Line 1 asterisks, it will delete the first and second of these but leave the third.[7] As long as we make sure that Rule 10 applies before Rule 11, these rules will assign the correct stress in the cases we have seen so far. Derivations for the words meaning 'the dogs' and 'the eyes' are given below:[8]

```
12)                                   *
      * * *             *             *
      * * *         * * *         * * *
      a-la-kʷa ---> a-la-kʷa ---> a-la-kʷa      'the dogs'
             (Rule 10)     (Rule 11)

                    *
      *   *         *   *
      * * *         * * *
      a-la-kʷa ---> a-la-kʷa        'the eyes'
             (Rule 11)
```

At first it might seem undesirable to replace one rule (Rule 6) with two (Rules 10 and 11), but there are advantages to our metrical solution. For one thing, Rule 6 is fairly language-specific; it is unlikely that this rule is needed in the descriptions of too many other languages, if any. On the other hand, Rules 10 and 11 are each independently necessary in numerous other languages. Rule 10 is essentially the rule of Clash Deletion described in Prince (1983), and it is found in Chamorro (Chung 1983), Yidinʸ (Dixon 1977), and Tulatulabal (Prince 1983), among others. Rule 11 is a version of the End Rule, also described in Prince (1983); it occurs in many of the more conservative Indo-European languages (Halle and Kiparsky 1977) as well as in MalakMalak (Birk 1976), Classical Arabic (Goldsmith 1990: 202) and elsewhere. One of the goals of metrical phonology is to reduce the stress systems of the world, as much as possible, to a relatively small set of principles which can interact in various ways to produce complex systems; surely we should prefer an analysis involving two highly general, possibly universal rules to one involving one idiosyncratic, language-specific rule.

The metrical analysis also allows a ready explanation of so-called "irrational" schwas. There are some instances of nonautomatic schwa which do not occur under stress, and these have been a source of puzzlement for previous analysts. However, Spruit (1985) notes that these irrational schwas always appear in a dominant (i.e. accented) mora which is not immediately followed by another dominant mora, much like stress (cf. Rule 6). Irrational schwas are underlined in the following examples, and to save space I will henceforth use the abbreviatons A and U for accented and unaccented moras respectively.

13) a. a-phʷás-kʸəya 'the honest woman'
AAA UA U

b. d-k'əla-gəla-gʷəšʸa 'did he go and stand into it, alas?'
U A U AU A U

In metrical terms, the moras where nonautomatic schwas appear are those which remain accented after the application of Rule 10 (and which do not already contain a vowel). Thus all we need to do is have a rule ordered between Rules 10 and 11 which inserts a schwa in accented consonantal moras:

10')

$$\begin{array}{lcl} & & * \\ & & * \\ \varnothing \dashrightarrow \text{ə} & / & \mu \\ & & \vdots\;\ddots \\ & & C\,\_\_ \end{array}$$

Rule 10' uses a combination of metrical and autosegmental notation in a fairly straightforward way; it states that a schwa is inserted in any accented mora which is connected only to a consonant. In a full account of Abkhaz phonology this rule would probably have to be stated in a slightly different way, but for our purposes it will do fine.

3. Some apparent exceptions

The rules described above account for the position of stress in the great majority of Abkhaz words, but there are some morphemes which do not fit in so neatly with our analysis. For example, the morpheme *-ba-*, which forms questions from certain types of relatives, is always stressed, regardless of the stress status of the surrounding morphemes:

14) a. d-an-bá-pa-wa 'when does he jump?'
UAA ? U A

b. d-an-bá-ca-wa 'when does he go?'
UAA ? A A

(14a) is consistent with *-ba-* being accented, since it is stressed and followed by an unaccented mora; but if that were the case, we would expect (14b) to be *d-an-ba-ca-wá,* since there *-ba-* is immediately followed by two accented moras. This morpheme does not fit into either of our two classes, and the question is what to do about it. Spruit (1985) simply notes that *-ba-* is always stressed, and in his stress notation he writes it as, in effect, a class of its own:

14) b′. d-an-bá-ca-wa 'when does he go?'
UAA ba A A

This is clearly an ad hoc solution, but in Spruit's formalism there is little else that can be done; his Recessive and Dominant are monadic categories, and anything which does not fit them has to be noted as an exception.

With our metrical analysis, though, another possibility presents itself. Since *-ba-* always ends up stressed, we could say that it is lexically stressed; that is, instead of just two asterisks in its lexical entry, it has three. Thus, the word meaning "when does he go?" (14b above) would have the following underlying metrical grid:

```
15)        *
        ** *  *  *
      * ** *  *  *
      d-an-ba-ca-wa      'when does he go?'
```

Rule 11 does not (indeed, must not) apply here; we could block its application by means of a principle (probably necessary anyway) stating that only one main stress is allowed per word. Our other two rules (Clash Deletion and Schwa Insertion) do apply; nonautomatic schwas appear in words containing *-ba-* just where we would expect them:

16) y-an-bá-s-tə̨-pa 'when did it jump out of me?'
AAA ba A A U

One question we might ask is what happens to the Line 1 asterisk over *-ba-* in a word like (15) above, since this asterisk seems to be in the right environment for our Clash Deletion rule. Presumably we do not want this asterisk deleted, because it has a Line 2 asterisk above it. It is a fairly simple matter to block Clash Deletion here by invoking a structural condition stating that any asterisk must be "supported" by asterisks directly below it; such a condition is invoked by Halle and Vergnaud (1987: 71), for example.

Another morpheme which seems to violate the normal stress rules of the language is the causative prefix *-r-*:[9]

```
17) a. a-r-t'ʷa-rá    'to cause to sit, to seat'
       A ? A  A

    b. á-r-cʷa-ra     'to cause to sleep'
       A ? U  A
```

In (17a) *-r-* appears to be accented, since if it were unaccented the stress would fall on the prefix *a-*. But in (17b) the stress is on the prefix, so here *-r-* appears to be unaccented. Spruit (1985) points out that the behavior of *-r-* corresponds to that of the root: if the root is accented, *-r-* behaves as accented; if not, not. As with *-ba-*, he then writes *-r-* as its own separate stress class, specifying that it assumes the stress status of (the first mora of) the root:

```
18) a-r-t'ʷa-rá    'to cause to sit, to seat'
    A r  A  A
```

Once again, though, there is another option open to us in the metrical system. The words in (17) behave, stresswise, exactly as they would if *-r-* were not present; we could say that, in effect, *-r-* is invisible to the stress rules[10]. We can get this result if, metrically, *-r-* lacks even a Line 0 asterisk in its lexical entry; in other words, it is lexically extrametrical:[11]

```
19) a. *    *   *
       *    *   *
       a-r-t'ʷa-ra    'to cause to sit, to seat'

    b. *        *
       *    *   *
       a-r-cʷa-ra     'to cause to sleep'
```

In terms of their metrical grids, these words are identical to their noncausative counterparts; as far as Rules 10 - 11 are concerned, the causative morpheme does not even exist. This extrametricality in the middle of a word may seem unusual, but there is actually no reason why we cannot have it in the lexically-based stress system of Abkhaz. In many languages, the metrical grid is determined entirely by such factors as syllable position and vowel length, so that given a transcription of a word, it is possible to construct that word's metrical grid; in such a system there is no need to specify any metrical information in lexical entries. But the metrical grid of an Abkhaz word is determined entirely by the morphemes involved; each morpheme's lexical entry contains the information it contributes to the metrical grid. In most cases this will be either one or two asterisks, but there seems to be no reason why there could not be a morpheme which contributes no asterisks, or three, to the metrical grid; after all, the lexicon is where idiosyncratic properties of lexical items are stored.

4. Conclusion

Metrical phonology allows us to account in a fairly straightforward way for the behavior of the anomalous morphemes *-ba-* and *-r-*, as well as for the assignment of stress in regular words. The two "anomalous" morphemes form a symmetrical pattern with the two "regular" stress types, going from stressed (three asterisks) to accented (two) to unaccented (one) to extrametrical (none):

20) Line 2	*			
Line 1	*	*		
Line 0	*	*	*	
	ba (interrogative)	la 'dog'	la 'eye'	r (causative)

This symmetry is appealing, but it is certainly not the only reason to prefer the metrical analysis. We have seen that expressing the two main stress classes of Abkhaz as accented vs. unaccented allows us to reduce Spruit's idiosyncratic stress assignment rule to the two extremely common rules of Clash Deletion and the End Rule. Our analysis of *-ba-* and *-r-* uses the same notation used for the main stress classes, extended in a logical way; also, this analysis does not require any extra rules, only explicit recognition of some principles which are needed anyway. This paper has not dealt with every aspect of the Abkhaz stress system, by any means, but I hope to have shown that grid-based metrical phonology can be a valuable tool for understanding puzzling data.

NOTES

*Thanks are due to Stephen Anderson, Bill Darden, John Goldsmith, and Loren Trigo for their comments and criticisms. This is not to say they agree with everything I have written, and as usual all errors are my own responsibility.

[1] The automatic-nonautomatic schwa distinction is similar to the distinction between epenthetic and excrescent vowels noted by Levin (1987). Trigo (1991a) tries to account for automatic schwas in a more purely phonological way than Spruit suggests.

[2] I follow Hyman and Bagemihl in treating onsets as belonging to the same mora as the following vowel, at least on the surface. In Hayes (1989), the onset is not considered part of any mora, but is connected directly to a syllable node; the choice betwen the two

analyses does not seem to be a major one for our purposes. Also, there is a long vowel (/aa/ or /a:/) in Abkhaz, which according to Spruit is always a separate element (i.e. mora) by itself. This analysis is subject to question, but since it is not directly relevant to the topic of this paper, I will ignore long /a/ for the sake of simplicity.

[3] In this paper I use the following diacritics on consonants: C^w = labialized; C^y = palatalized; C' = glottalized. Also, in writing Abkhaz forms, I will follow Spruit (1985) in using a sort of semi-phonemic notation, in which only the two vowels /a/ and /ə/ are recognized, but schwas are written wherever they appear on the surface.

[4] Spruit describes some simple diagnostic tests which can determine the stress status of at least the first mora of a morpheme. In some morphemes which are longer than one mora, these tests are unable to distinguish between the two types, and Spruit calls these "indeterminate" moras. These indeterminate moras pose no problems for the analysis in this paper, and in many cases other tests can reveal them as either accented or unaccented.

[5] The word "accent" here does not refer to pitch-accent, but rather to a more abstract property of syllables which makes them more prominent and is only indirectly realized phonetically. There is a parallel in the literature on Tonga to my updating of Spruit's terminology: Meeussen (1963) uses the terms "determinant" and "neutral" in much the same way Spruit uses "dominant" and "recessive", and when Goldsmith (1982) accounts for the same data using autosegmental phonology, he switches to the terms "accented" and "unaccented". Also note that although Halle and Kiparsky use the terms "dominant" and "recessive" to distinguish different types of suffixes, this has nothing to do with Spruit's (and my) use of these terms.

[6] This analysis is very similar to the one arrived at independently by Trigo (1991a).

[7] One could also say that the rule applies simultaneously to all the relevant portions of the underlying representation; we get the same results in either case.

[8] After stress has been assigned, we will also need to eliminate Line 1 asterisks in unstressed syllables; these are usually taken to represent secondary stress, which does not exist in Abkhaz. This could be done by a rule of line conflation, as in Halle and Vergnaud (1987: 50).

[9] There is another morpheme *-r-*, a directional prefix meaning 'across (water)', but it behaves as a normal unaccented mora. According to Loren Trigo (personal communication) in some dialects of Abkhaz causative *-r-* behaves as accented, but in the dialect described by Spruit (which is the basis of the literary language and

the subject of the present paper) this is not the case.

[10] Actually, *-r-* can have an indirect effect on the stress of a word; it causes all preceding moras in the word to become accented, except if there is a preverb, in which case only moras following the preverb become accented. We can see this in (i) and (ii) below, where the 3rd person absolutive prefix *d-* and the 1st person ergative prefix *s-* behave as accented even though they are lexically unaccented:

i) də́-r-cʷa-nə 'having caused him to sleep'
U r U A

ii) d-sə́-r-cʷa-ma 'did I cause him to sleep?'
U U r U U

This could be analyzed as a kind of preaccent which is somehow blocked by a preverb; alternately, Trigo (1991a) treats it as involving cyclicity, with certain prefixes being cyclic and the rest noncyclic. Note that this phenomenon is not limited to *-r-*; it is also found, for example, in the verbal root *-žʸ-* ('to throw'), which otherwise behaves as a normal unaccented mora:

iii) y-ta-sə́-žʸ-sʷa 'as if I threw it into it'
U A U U A

I thus conclude that this preaccent (despite being an interesting phenomenon worthy of further study) is independent of the stress status of the morpheme involved, and thus not relevant for the present discussion.

I should also note here that Trigo (1991a,b) analyzes causative *-r-* differently than I do, eventually concluding from its behavior that accent belongs on a separate plane from the metrical grid. My framework can (I believe) handle the facts examined by Trigo without forcing such a conclusion, but because of space limitations a demonstration will have to wait for another time.

[11] I am using the term "extrametrical" in a nonstandard way here, and perhaps another word with less intellectual baggage would be less confusing. (One possibility, suggested by Stephen Anderson, is "nonmoraic".) However, I will continue to use "extrametrical" because it is descriptive and to the point.

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ESCOL '91 222-233

WHEN NOMINALS ARE PREDICATES*

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I. Introduction

In this paper I present evidence for the claim that the argument-predicate distinction in noun phrases can be syntacticized; that no noun phrase is syntactically ambiguous between an argument and a predicate reading. Many of the current discussions of predication in linguistics are concerned with verbal predication, as in the work of Rothstein (1983; 1991). The data and claims regarding the data which I present are limited to argument and predicate **noun phrases**, however; therefore I make no further reference to these other analyses. In particular, I focus on nominal Small Clause constructions with respect to the properties of their predicate noun phrases. I also argue for an analysis of arguments requiring argument noun phrases to be headed by a determiner, or realization of the determiner position in the argument noun phrase. Much of what is at issue touches on the relation of syntax to semantics. Yet a prolonged excursion into this question is beyond the scope of this paper, and so I restrict the discussion to the facts and analyses of them exclusively.

II. Arguments versus Predicates

As alluded to above, my analysis of arguments requires there to be instantiation of the determiner node in any noun phrase constituent playing the role of argument. Typically, these will be definite and indefinite noun phrases, genitive noun phrases, proper names, and pronouns. In many cases, the determiners in these noun phrases are overt, and easily recognized. However there are examples of arguments in which no determiner appears, at least overtly. In order to describe how this analysis works, I next state the assumptions upon which it is contingent.

First, I adopt the DP hypothesis of Abney (1987), which has as one of its primary features the headedness of determiners, or of those elements that occupy the D position. I support this hypothesis regarding the structure of arguments, and yet claim that the NP structure presumed traditionally in linguistics applies to predicate noun phrases. Second, I assume with Frege that there is a rigid separation between object terms and concept terms: Arguments are **object** terms in Frege's terminology, and predicates are **concept** terms. In that case, arguments, if they are to be so represented syntactically, must manifest their referentiality syntactically.

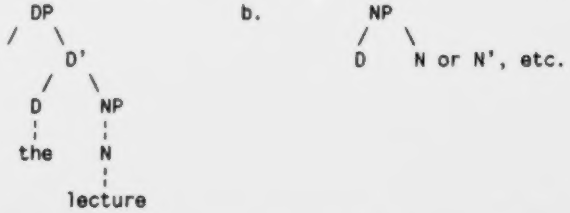
In addition, I allow for the possibility of occurrences of null determiners, as in Fiengo (1974), and in fact argue for their existence in some cases.

Consider examples (1)-(8):

(1) *the rice* in the soup was too soft
(2) the stuffing was mostly *rice*
(3) I would not drink *that water* if I were you
(4) just about all that lemonade was *water*
(italicized nouns are mass)
(5) *those beans* are not good for chili
(6) but chili is mostly *beans*
(7) all *the computers* in the lab were down
(8) the subject of the lecture was *computers*
(italicized nouns are plural count)

Notice that half the sentences exhibit the italicized nouns as arguments, and half as predicates. What I propose is reconsideration of whether the arguments are, in fact, comprised by merely a noun, or whether they consist of determiner-noun combinations. ter Meulen (1981) points out that mass nouns not preceded by (overt) determiners are actually predicative, while those preceded by determiners are nominal, or arguments. In this vein, what we might consider as the structure for argument noun phrases appears at (9a), while what I will be assuming as the structure for predicate noun phrases appears at (9b):[1]

(9) a.



Note that the italicized nouns in (5)-(8) are plural count nouns and not mass nouns. In English, bare singular count nouns are almost never used as predicates; they require determiner heads. Yet there are examples of bare plural count nouns and mass nouns which are used as arguments, as in (10)-(13). According to the proposal just stated, these would have to be DP's, in much the same way as the example at (9a), which has a determiner, is a DP.

(10) *beavers* build dams
(11) *whales* are mammals
(12) *platinum* is rare
(13) *sugar* is sweet

Fairly simple, typical examples like these would demonstrate the need for a null determiner in some positions; specifically, in positions where the plural or mass term is used as an argument, and no overt determiner appears. Hence, for these cases, D is occupied by a null determiner. Most commonly, the instantiation of a null determiner seems to be required in generics. In Mandelbaum (1991) I argue that proper names occupy D, as is suggested by Longobardi (1991). Longobardi accounts for arguments consisting of bare nouns by N-to-D movement, in Italian within the syntax; in English at LF. Additional cases appear in (14)-(17), in which bare nouns which are arguments are not universally quantified, as are generics, but are existential instead:

(14) *beavers* were on my front porch
(15) *platinum* was discovered in mines in Africa
(16) *cars* are on the road
(17) *police* are in every city

The italicized expressions are existentially quantified. As is suggested by both Abney (1987) and Longobardi (1991), if the notion of reference to an object is inextricably bound with quantification (ergo, determiner expressions), these require realization of the D position as well. Hence, we could allow a null determiner to head these nouns as well. And in fact, it becomes necessary to represent the D position for sentences like (10)-(17) if we wish to represent the argument-predicate distinction syntactically, since many bare plurals and mass nouns are predicational. For the predicational examples, D is not realized.

Notice that genitives pose no problem for this analysis, since, as is presented by Abney, the genitive occupies a DP, and can be realized in argument noun phrases. Moreover, as claimed by Postal (1966) and later once again by Abney, pronouns can easily be analyzed as determiners and thus fit in rather nicely as well. Examples of different types of argument DP's are shown in (18)-(20):

(18) $[_{DP}$ John's coat] was worn by $[_{DP}$ Harry]
(19) $[_{DP}$ Michelle's coat] was worn by $[_{DP}$ her]
(20) $[_{DP}$ the Cubs] wore $[_{DP}$ their team uniforms]

The final set of facts I will consider for the argument analysis appear in (21)-(26):

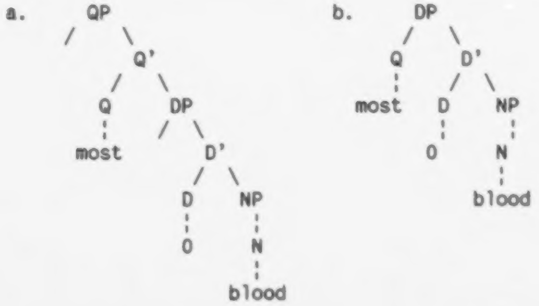
(21) *all of bronze* is tin
(22) *most of blood* is plasma
(23) *how much of water* is oxygen

Compare (21)-(23) with (24)-(26).

(24) *all bronze* is tin
(25) *most blood* is plasma
(26) *how much water* is oxygen

Notice that the two sets of examples bear different meanings, so it must be the case that they have distinct representations. That is, although it is true, for example as stated in (22), that most of blood is plasma, the truth of (25), that most blood is plasma, is very open to question. If the argument noun phrases in (24)-(26) are DP's, however, what is the representation of the argument noun phrases in (21)-(23)? It would appear most likely that there is a constituent between the partitive quantifier and the noun, yielding the argument phrase in (27a) as the representation of (22), for example. The structure in (27b), then, is the representation of the argument noun phrase in (25).

(27)



The 0 in D of these phrases represents the null determiner, which I am claiming heads the argument noun phrase for these cases. The particle "of", although not represented in the tree at (27a), is inserted for partitive Case between Q and DP. So the structure of the argument noun phrases in (24)-(26) is DP, while the structure for their partitive counterparts in (21)-(23) is QP. Note that this manner of representing Q parallels the manner in which we have represented D, in that as D can occupy either the head of DP or SPEC NP, Q can occupy either the head of QP or SPEC DP.[2]

III. PREDICATE NOUN PHRASES: THE DISTRIBUTION

The noun phrases that appear to be the most likely candidates for predicate status are those found in the predicate phrases of nominal Small Clauses, and as predicate nominals in certain sentences. Although I have argued in section I of the paper that any noun which cannot be represented as the head or complement in a determiner phrase is itself a predicate, there are entire phrases which too share this status. Some examples are provided in (28)-(31).

(28) John considers him *a liar.*
(29) Stacy considers mosquitos *dangerous animals.*

(30) Those are *the best pool players in town.*
(31) These lions are *the finest animals in the circus.*

There is a clear distribution of possible predicate noun phrases. Often, it is definite descriptions which seem to occur in these environments, having a predicative rather than a referential interpretation (as specified in Higginbotham, 1987). The predicative phrases in (30)&(31) are illustrations of this. These may appear as the predicates in nominal Small Clauses, as well, as in (32)&(33):

(32) I consider John *the best friend I have.*
(33) Shari considers them *the nicest people in the office.*

Equally significant is the fact that not all noun phrases containing a definite determiner may occur in these environments, as shown in (34)-(36):

(34) * I consider them *the men.*
(35) * John considers them *the pool players.*
(36) * Stacy considers those *the animals.*

When set in copular contexts these phrases are acceptable, except there it is likely that they have an identificational reading instead of a predicative one (as per Fiengo, 1988). This is exemplified in (37)-(39):

(37) They are *the men.* (? predicational interp)
(38) They are *the pool players.* (? predicational interp)
(39) Those are *the animals.* (? predicational interp)

It appears to be the case, then, that only certain definite descriptions can occur in predicative positions. I will describe the rest of the distribution to be discussed at this point, and then provide some suggestions as to why that particular distribution occurs.

I should note that there is some question as to the status of the non-expletive subject in There-insertions in this context. On the one hand, these subjects look like post-copular noun phrases. On the other hand, if the copula's function is to relate a concept term to an object term, and this is taken by us to mean a predicate to an argument, the "be" verb in There-insertions is not actually a copula, since the non-expletive subject in There-insertions is an argument, and not a predicate. What is being related by the existential "be" in There-insertions is therefore not part of our distribution. In any event, possessive noun phrases, for example, although inadmissable as non-expletive subjects in There-insertions, are perfectly acceptable predicates in Small Clauses, and as post-copular predicate nominals as shown in (40)&(41).

(40) I consider Mary my favorite cook.
(41) John is my friend.

In addition, there is interesting data involving partitives to consider with respect to predicates. Compare (42)&(43) with (34)&(35). Although the partitive has been applied to the predicate noun phrases of these Small Clauses, their unacceptability remains unchanged.

(42) * I consider them *five of the men.*
(43) * John considers them *some of the pool players.*

Now observe that (44)&(45) parallel these cases, in that partitives applied to acceptable predicates yield acceptable predicates:

(44) John considers them *five of the best pool players in town.*
(45) Stacy considers these lions *some of the finest animals in the circus.*

What seems to be the case, then, is that the potential role of a noun phrase as predicate is unaffected by the partitive. However, this turns out not to be so, as witnessed by the cases in (46)-(48):

(46) * John considers them *most of the best pool players in town.*
(47) * Stacy considers these lions *all of the finest animals in the circus.*
(48) * Stanley considers them *each of the best hotdogs he's tasted.*

Notice that all the noun phrases in (46)-(48), without the partitive, would be fine in their predicational contexts. So the acceptability of a nominal predicate to which the partitive has been applied must be contingent on the particular partitive present, at least in the sense that some partitives disqualify their noun phrases from predicate position. One factor that I might note here is that all of the noun phrases which are starred in the examples mentioned so far are perfectly acceptable as subjects, or as arguments. Hence, whatever the restriction, it applies only to predicates. The structural analysis described for argument DP's and QP's is not going to be useful for these examples, as a result.

IV. Resolving the Distribution

An analysis of the distribution must isolate the various types of predicate noun phrase possible. It has been recognized by Stowell (1989), among others, that Small Clause predicate noun phrases will usually be definite descriptions only if they are "uniques". In many cases, a uniqueness effect is inherent in the superlative morphology of these noun phrases. However, superlative morphology is surely not a necessary criterion for acceptability in predicate nominal position, even for uniques, as demonstrated by (49)&(50); definite descriptions that are unique, but not superlative:

(49) Mary considers Bill *the guardian of her children.*
(from Stowell, 1989)
(50) I consider him *the man for the job.*

Possibly what is operating, then, in definite nominal predicates is the Definiteness Effect. (51)-(53) demonstrate the Definiteness Effect in argument position:

(51) John bought *a picture of every actor.*
(52) ? John bought *the picture of every actor.*
(53) John bought *the best picture of every actor.*
(from Fiengo, 1987)

As (53) is equally acceptable to (51), while (52) is marginal, this argument paradigm appears very similar to the Small Clause cases we have been examining. Therefore, it seems possible that nominal Small Clause contexts exhibit the Definiteness Effect in much the same way as do other familiar Definiteness Effect environments, except that we are faced with the following data:

(54) John bought *many pictures of every actor.*
(55) * I consider them *many men.*

While for the purposes of the Definiteness Effect, so-called weak determiners pattern with indefinites, such as "many" in (54), the "weakness" of such determiners does not save them, so to speak, in environments like the one in (55). Notice that (56) is no better than (55), demonstrating that a weak partitive determiner in a nominal predicate is not sufficient to save it either. Hence, we cannot count on the Definiteness Effect to explain the distribution.

(56) * Stacy considers those flounder *some of the fish.*

Further evidence against a Definiteness Effect analysis of nominal Small Clause predicates can be found in (57)-(60), exemplifying that the indefiniteness of the predicates in (59)&(60) cannot be assimilated to weakness in order to explain their acceptability.

(57) * Napoleon considered his enemies *many liars.*
(58) * Shakespeare considered the Romans *some fools.*
(59) John considers him *a liar.*
(60) Sidney considers his wife *a fool.*

Having thus ruled out a Definiteness Effect analysis for the nominal Small Clause paradigm, we are left with the distribution in (61)-(64):

(61) Shakespeare considered the Romans *fools.*
(62) Juliet considered Romeo *her prince.*

(63) Julius Caesar considered Brutus *a friend.*
(64) Everyone considers Iago *the meanest character in the play.*

It is useful to observe that cases like the ones in (65)&(66) are acceptable Small Clauses only when the predicate noun has a predicational interpretation. This may seem a trivial point to make, but it helps to explain (61)&(63). That is, the fact that (34)-(36) are so degraded may have nothing to do with the definite determiner, but rather have to do with what sort of noun can possibly be predicational. So then (61)&(63) have inherently predicational nouns in predicate position, which reduces the explanation for at least part of the distribution to the level of the lexicon.[3]

(65) Any self-respecting sports fan considers Montana and Strawberry *ballplayers.*
(66) Marilyn Monroe considered John Wayne *a man.*

Yet this is not enough, since we still need to explain what degrades (67)&(68), given that each of these has a full-fledged predicational noun in predicate position. The answer to this question relies on the analysis of arguments presented in the first section of this paper. There we argued that what allows a noun phrase to function as an argument is its being headed by a determiner; so to speak, the determiner closes the predicate. Even an inherently predicational noun is subject to this mechanism, especially if the determiner in question is definite. The entailment of this observation, then, is that some noun phrases may never function as predicates. The one exception to requisite argumenthood for definite noun phrases is the case of uniques, which are definite, and yet may still function as concept terms.

(67) ? Shakespeare considered the Romans *the fools.*
(68) ? Napoleon considered his enemies *the liars.*

Examples (62) and also, (69), hark back to example (40). Remember that we said in the discussion of argument noun phrases that possessive, or genitive, noun phrases appearing in argument positions are DP's. Yet genitives can equally well appear in predicative position, as demonstrated by (40), (62) and (69). Notice that (41) is ambiguous between the identificational reading, or argument reading, of the phrase "my friend", and the predicational reading of the same phrase. Hence we would be committed to two possible representations for this sentence: One in which the phrase "my friend" is a DP, and one in which it is an NP. The phrases containing genitives, therefore, in the Small Clause contexts of (40), (62) and (69), are then NP's.

(69) I consider John *my friend.*

We are finally left with the partitives in (42)-(48) to consider. Descriptively, weak determiners are acceptable in partitive quantifications over unique predicates of nominal Small Clauses, while strong determiners are not. One interesting fact is that the partitive does not influence what I have loosely called a lexical phenomenon, namely which sorts of nouns lend themselves to predicative position altogether. Examples (42)&(43) show this. Automatically this makes (44)-(48) look as if the partitive's contained noun phrase influences the partitive determiner itself. That is, if (42)&(43) are blocked by virtue of lexical properties, then an argument can be made that the inner noun phrase interacts with the partitive in all these cases.

Besides, consider (70)-(73):

(70) * Handel considered his compositions *many masterpieces.*
(71) * Mozart considered his works *some masterpieces.*
(72) * Verdi considered his operas *most masterpieces.*
(73) * The Beatles considered their songs *all masterpieces.*
(* non-Q-Float reading)

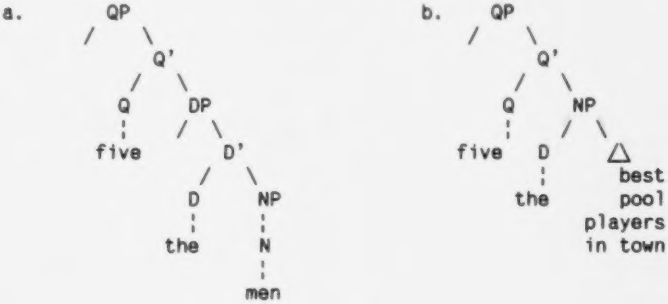
Each of these cases is blocked, whether the predicate phrase has a strong determiner, or a weak determiner. So we cannot simply say that strong determiners are unacceptable, and weak ones acceptable, in nominal Small Clause predicates. Notice, incidentally, that (74) is fine; so the problem is not related to the lexical properties of "masterpiece".

(74) Beethoven considered his concerto *a masterpiece.*

Thus, the distribution in (44)-(48) calls for an analysis. Notice that the predicates in question are all uniques, incorporating a definite determiner. Note also that as we said earlier, uniques here are concept terms; in other words, not arguments.

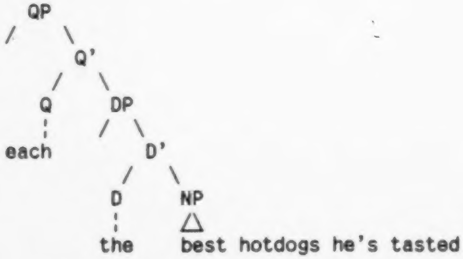
Given all these facts, the unacceptable predicate noun phrases (which, incidentally, cannot be saved by partitive quantification) are DP's, whereas the acceptable ones are NP's. Hence, we have the structures provided in (75) for (42) and (44) respectively:

(75)



Yet, as is exemplified by (46)-(48), there are acceptable predicate noun phrases that, once subject to the partitive, are rendered unacceptable. Hence, for example, the final noun phrase in (48) can be represented as (76):

(76)



Observe that representing (48) as (76) commits us to a restriction on the final noun phrases in (46)-(48) as being arguments. What sets these cases apart from those in (44)&(45), as mentioned earlier, is the quantification of a strong partitive over a definite noun phrase, as opposed to quantification of a weak partitive over a definite noun phrase. Within the generalized quantifiers framework of Barwise & Cooper (1981), the so-called Partitive Constraint requires that partitives quantify over definites. Hence, our result looks odd, since strong over strong seems a given in that framework. However, in the cases which Barwise & Cooper consider, the noun phrases to which the partitive is applied are arguments, and the constraints governing noun phrases in argument position are entirely different than those governing noun phrases in predicate position. Thus even if we accept the prevailing semantic definitions of properties like "weak" and "strong", we are still obliged to realize that one application of these terms, such as that in Barwise & Cooper to argument quantifiers, does not entail the identical sort of application in other cases, such as the ones in this paper, many of which are predicates.

V. CONCLUSION

To conclude, I shall summarize the analyses sketched in this paper. I have argued that in order for a noun phrase to be an argument, it must be headed by a determiner, or a syntactic realization of the D position in a DP structure; otherwise, it is an NP. Then I have examined a distribution of predicate noun phrases, noting that the only possible predicate nominals actually incorporating determiners are indefinites and uniques, which are easily used as concept terms. Partitive Small Clause predicate nominals may sometimes be acceptable, but bring to light the fact that current semantic analyses of partitive quantification are insufficient, as they neglect cases of such quantification over predicate nominals.

FOOTNOTES

* I am indebted to Bob Fiengo for much helpful discussion of the ideas in this paper. Thanks are also due to the members of the CUNY Syntax Workshop, especially to Richie Kayne, Richard Larson and Janet Fodor; and to the participants of ESCOL '91, especially to Ray Jackendoff, Peter Culicover, Tony Kroch and Alec Marantz. Additional thanks to Terry Langendoen, Judy Bernstein, Lori Davis, Jody Azzouni and Joyce Powers for conversations engendering some of the ideas suggested here.

1. I am not committed to projecting from D to NP in the case of predicative noun phrases. A potential alternative structure would instantiate DP, instead of D, in SPEC position of NP for predicate noun phrases. Particularly for reasons having to do with Case, a structure incorporating DP in SPEC position might be preferable. My intention, for the purposes of this paper, is to structurally distinguish argument noun phrases from predicate noun phrases.

2. see fn. 1: an alternative structure for this particular set of facts (24-26) might posit QP internal to DP, in order to avoid having lexical categories, such as Q in (27(b)), in positions normally reserved for maximal projections.

3. Tony Kroch points out that lexical properties of the verb "consider" may well restrict the distribution of possible predicative noun phrases in Small Clause examples containing it. The verb "consider" was chosen for all the Small Clause examples here since, as is well known, what follows is clearly predicative. Other predicative contexts, as mentioned by Ray Jackendoff, yield the same results:

John *strikes* me *as* a fool, and
Those *seem to* me some of the best hotdogs in Coney Island, but
* Joan *regards* those women *as* most of her best friends.

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ESCOL '91 · 234-253

CASE AND LICENSING

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It is fairly well understood that noun phrases (or DPs) occupy argument positions in sentences (or bear grammatical relations or functions) by virtue of the semantic roles they bear with respect to predicates.* Current Principles and Parameters theories, following Chomsky (1981), add an additional condition on licensing NP (DP) arguments: they must also be assigned (abstract) Case. Recent investigations of languages with rich morphological case and agreement systems strongly indicate that the relationship between abstract Case and morphological case and agreement is indirect, at best. In this paper, I argue that the proper treatment of morphological case necessitates a complete break between abstract Case and morphological case. I show that the facts covered by "Burzio's generalization" (Burzio 1986) split into two sets explained by independently motivated principles. One set is covered by the "Extended Projection Principle" (see, e.g., Chomsky (1986, p. 4)), in particular, the requirement that sentences have subjects. The remainder is handled by the correct universal characterization of "accusative" and "ergative" morphological case, a characterization that also successfully explains a peculiar fact about the distribution of ergative case. Giving content to the theory of morphological case allows for the elimination of abstract Case theory from the theory of syntax. The mapping between semantic roles and argument positions, augmented by the subject requirement of the Extended Projection Principle, is sufficient to license NPs in argument positions.

I. Ergative case and Burzio's generalization

The examples in (1-3) illustrate an interesting feature of what's called ergative case in many languages -- here I draw on Georgian (Harris 1981, Aronson 1982). In present, future, and other "series I" tenses,[1] Georgian shows nominative case on the subject and dative case on the object (in Georgian, dative and accusative morphological case have fallen together into what's called the dative case) -- see (1a,c). However, in the aorist or simple past ("series II"), we find ergative case on the subject and nominative case on the object. This is true for regular (class 3) intransitive verbs -- unergative in Relational Grammar terms -- as in (1b) and for transitive (class 1) verbs as in (1d). The contrast in the case-marking patterns between the series I INFL in (1a,c) and the aorist from series II in (1b,d) should be clear: only the aorist yields ergative case on the subject NP (and nominative case on the object of a transitive verb).

(1) a. vano [pikr-ob]-s mariḳaze.
Vano-NOM [think$_3$]-INFL$_I$ Marika-on
'Vano is thinking about Marika.'
b. vano-m [i-pikr]-a mariḳaze.
Vano-ERG [think$_3$]-INFL$_{II}$ Marika-on
'Vano thought about Marika.'

c. nino gia-s surateb-s [a-čven-eb]-s.
Nino-NOM Gia-DAT pictures-DAT [show$_1$]-INFL$_I$
'Nino is showing pictures to Gia.'
d. nino-m gia-s surateb-i [a-čven]-a.
Nino-ERG Gia-DAT pictures-NOM [show$_1$]-INFL$_{II}$
'Nino showed the pictures to Gia.'

The examples in (2) illustrate what happens when we put unaccusative (class 2) verbs in the aorist; these verbs, like passives, have syntactically derived subjects. For the present and future (series I) tenses, intransitive unaccusative verbs have nominative subjects, as shown in (2a). In the aorist, the subject remains nominative -- it does not become ergative, as shown in (2b). The sentences in (3) show that unaccusative psychological verbs (class 4) in Georgian that have dative subjects and nominative objects also do not change the case marking on subject and object in the aorist. Class 4 psych verbs resemble class 2 unaccusatives in that, like the nominative subject of the class 2 verbs, the dative subject of the psych verb is syntactically derived from some VP internal position.

(2) a. es saxl-i ivane-s a=[u-šendeb]-a.
this house-NOM Ivan-DAT PreV=[built$_2$]-INFLI$_{3s}$
'This house will be built for Ivan.'
b. es saxl-i ivane-s a=[u-šend]-a.
this house-NOM Ivan-DAT PreV=[built$_2$]-INFLII$_{3s}$
'This house was built for Ivan.'
(3) a. šen pelamuš-i g-[i-qvar]-s.
you-DAT pelamusi-NOM AGR-[like$_4$]-INFL$_I$
'You like pelamusi.'
b. šen pelamuš-i g-[e-qvar]-e.
you-DAT pelamusi-NOM AGR-[like$_4$]-INFL$_{II}$
'You liked pelamusi.'

The same patterning of ergative case, summarized in (6), is observed for ergative case on the subjects in sentences with perfect tense/aspect in Hindi (examples from Mahajan 1991) and for ergative case with all tenses in Basque (examples from the discussion in Marantz 1984b). Note that ergative case is prohibited on the subject of unaccusative verbs in the perfect in Hindi -- (4a). Ergative is optional for the subjects of unergative verbs, as shown in (4b,c), and obligatory on the subjects of transitives, (4d). In Basque, ergative case occurs across tenses. As in Georgian and Hindi, ergative does not occur on the subject of an unaccusative -- (5a). It is obligatory, however, on the subject of unergatives and transitives -- (5b,c).

(4) a. siita (*ne) aayii. (unaccusative)
Sita (f.) (*erg) arrived/came (f.)

b. kutte bhoNke.
dogs (m.pl.) barked (m.pl.)

c. kuttoN ne bhoNkaa.
dogs (pl.) erg. barked (m.sg.)

d. raam-ne roTii khaayii thii.
Ram (m.) erg. bread (f.) eat (f.) be (pst. f.)

(5) a. Ni etorri naiz. (unaccusative)
I-ABS come 1sg-be

b. Nik lan egin dut.
I-ERG work do have-1sg.

c. Nik libura ekarri dut.
I-ERG book-ABS bought have-1sg

(6) Ergative case generalization: Even when ergative case may go on the subject of an intransitive clause, ergative case will not appear on a derived subject.

The sentences in (7) raise another interesting aspect of Georgian ergative case in the aorist. Although the case marking changes from NOM-DAT to ERG-NOM in (1a,c) - (1b,d), the agreement morphology sticks to the NOM-DAT pattern. In particular, the suffixal agreement that normally agrees with a nominative subject will agree with the ergative subject in the aorist.

(7) a. da=v-[mal]-e 'I hid something'
PreV=AGR-[hide$_1$]-INFL$_{II}$
b. da=∅-[mal]-e 'you hid something'
PreV=AGR-[hide$_1$]-INFL$_{II}$
c. da= [mal]-a 'he hid something'
PreV=[hide$_1$]-INFL$_{II}$
d. da= [mal]-es 'they hid something
PreV=[hide$_1$]-INFL$_{II}$

In the aorist sentences (7), the suffixal agreement, glossed as INFL, changes with the person and number of the subject, which would be in the ergative case if expressed as an overt NP. This is the same suffixal agreement that would agree with a nominative subject in other tenses. Thus Georgian shows a split ergative pattern in the aorist. Some Indo-Iranian languages closely related to Hindi show a similar split ergative pattern in the tenses that trigger ergative case (see, e.g., Mahajan (1991)).

These data raise the problem of what accounts for the generalization in (6), which seems well-supported cross-linguistically. Generalization (6), restated in (8b), is tantalizingly similar to Burzio's generalization, written as a generalization about accusative case as in (8a).

(8) a. Burzio's generalization: no accusative case on an object in a sentence with a non-thematic subject position
b. Ergative generalization: no ergative case on a non-thematic subject (i.e., on an argument moved into a non-thematic subject position)

Although it would be tempting to try to collapse the generalizations in (8), Burzio's generalization is not put correctly in (8). Rather, it is more accurately formulated as in (9):

(9) Burzio's generalization (as a one way implication): If a verb's subject position is non-thematic, the verb will not assign accusative structural Case.

That is, Burzio's generalization is about abstract Case, Case that licenses NPs in object positions. The Ergative generalization isn't about abstract Case but about the morphological realization of case on subjects. The subject position in Georgian is always licensed by tense/aspect inflection; that is, abstract Case is always (able to be) assigned to the subject position whether the verb is in the present, future, or aorist tense. The agreement patterns illustrated by (7) reinforce the fact that the subject is licensed by INFL; INFL agrees with the subject whether in nominative or in ergative case. However, the morphological shape of the case on the subject is different depending on the tense/aspect and the realization of ergative morphological case is subject to the Ergative generalization. Thus the Ergative generalization doesn't seem to have anything to do with abstract Case, while Burzio's generalization does.

Suppose then it is correct to relate the Ergative generalization to Burzio's generalization and it is also correct that the Ergative generalization is not about abstract Case but about the morphological realization of case. Then Burzio's generalization too may not treat abstract Case but rather the realization of accusative morphological case.

II. Burzio's generalization isn't about Case

Burzio's generalization seems to be about Case because objects are not licensed in a clause if the clause has a non-thematic subject, as in (10). Recall that "the man" in (10a) and "the porcupine" in (10b) should be licensed in the argument positions in which they appear by virtue of the semantic roles they bear in the sentences; these phrases are "projected" into the the post-verbal argument positions. Case theory, governed by Burzio's generalization, specifically accounts for these situations in which NPs do not seem to be licensed to appear in the positions into which they are projected.

(10) a. *It arrived the man.
b. *It was sold the porcupine.

Despite its ability to account for structures like (10), there are many examples in the literature of violations of Burzio's generalization -- situations in which objects are in fact licensed when there is a non-thematic subject. I've chosen the examples in (11-13) since they also violate the morphological accusative case version of Burzio's generalization -- it seems that morphological accusative is being realized in a sentence with a non-thematic subject. We want whatever principle that replaces the generalizations in (8) to account for these constructions as well.

Consider the Japanese example in (11a) from Kubo (1989). Kubo argues that this sort of passive, in which the derived subject is the possessor of an object, patterns with the so-called "direct" passives in Japanese and not with the "indirect" or adversity passives as in (11b). In particular, passives like those in (11a) behave on a variety of tests like other passives with traces in direct or indirect object positions and not like indirect passives like (11b) in which there is no gapped position. Kubo argues that direct passives like (11a) involve movement into a non-thematic subject position while indirect passives like (11b) contain a thematic subject position, into which arguments may be projected at DS. Despite the fact that the subject position in (11a) is non-thematic, the object seems to be licensed by structural accusative Case and appears with morphological accusative case as well.

(11) a. Hanako$_i$-ga (dorobo-ni) [t$_i$ yubiwa-o] to-rare-ta.
Hanako-NOM (thief-by) ring-ACC steal-pass-past
'Hanako had a thief steal her ring on her.'
b. Hanako-ga ame-ni hu-rare-ta.
Hanako-NOM rain-DAT fall-pass-past
'Hanako had rain fall on her.'

Bresnan and Moshi (1990) show that in what they call symmetrical object languages like Kichaga, passivization of one of the objects of a double object verb leaves the other object with all syntactic object properties. The Kichaga sentence (12a) is an active double object construction; the verb shows object agreement with both objects. (12b,c) contain possible passives of the verb in (12a). Either object may become the subject of the passive verb. Although movement in (12b,c) is into a non-thematic subject position, the object that does not become subject still seems to be assigned abstract accusative structural Case, realized via object agreement on the verb, in violation of Burzio's generalization. If we correlate accusative morphological case with object agreement morphology, (12b,c) violate the morphological version of Burzio's generalization as well as the abstract Case version.

(12) a. N-ä-ï-lyì-ï-à `m-kà k-élyà.
(He$_i$) AGRs$_i$-AGRo$_j$-AGRo$_k$-eat-BEN wife$_j$ food$_k$.
'He is eating food for his wife.'
b. `M-kà n-ä-ï-lyì-ï-ò k-èlyâ.
Food$_k$ AGRs$_k$-AGRo$_j$-eat-BEN-pass wife$_j$.
'Food is being eaten for the wife.'
c. K-èlyá k-ï-lyì-í-ò `m-kà.
Wife$_j$ AGRs$_j$-AGRo$_k$-eat-BEN-pass food$_k$.
'The wife is being beneficially/adversely affected by someone eating food.'

English raising examples like those in (13b,c) are well-known challenges to Burzio's generalization in any formulation. In (13) the objects of "strike" look as if they are being assigned structural Case by "strike" even though the subject position of "strike" is non-thematic. Note also that the morphological case on "me" and "her" is apparently accusative in (13), although it might be dative.

(13) a. It struck me that I should have used "Elmer" in this sentence.
b. There struck me as being too many examples in his paper.
c. Elmer$_i$ struck her as [t$_i$ being too stubborn for the job].

If, as the examples in (11-13) suggest, Burzio's generalization doesn't govern abstract Case, why then are the sentences in (10) bad; why don't we just assign Case to the objects in such structures and be done with it? On standard assumptions, the structures in (10) would have underlying structures as in (14), with empty subject positions.

(14) a. e arrived the man.
b. e was sold the porcupine.

Suppose we assume the "Extended Projection Principle" or some sort of "subject condition" -- some condition that sentences (IPs) require (structural) subjects (cf. the final 1 law of Relational Grammar and the subject condition of LFG). By any such condition, the structures in (14) will have to get subjects to be well-formed. Assuming that movement comes for free while insertion of a dummy subject in environments like (14) is a last-resort option for satisfying the Extended Projection Principle (EPP),[2] we predict the ungrammaticality of (10) without recourse to Case theory at all; the EPP and standard assumptions about the "economy" of derivations (move for free rather than insert a dummy at cost) will suffice. That is, the issue surrounding examples like (10) is not whether or not Case may be assigned in such environments but rather whether sentences are licensed if there is no subject. Since objects may freely solve the subject requirement through movement, it misleadingly appears as if objects are not licensed (assigned Case) if there is no subject.

If this line of thinking is correct, then NPs (DPs) may be licensed to appear in the positions that they do by the EPP; that is, argument structure to syntax mappings plus the need for sentential subjects would account for the distribution of NPs (DPs). So licensing might follow from projection without Case theory. If abstract Case is sufficiently distinct from morphological case, then Case theory might be entirely superfluous.

III. "Case" (=licensing) isn't "case" (morphology)

Linguists have already established that the connection between abstract Case as the means to license NPs and morphological case as what you see on NPs can't be too close. The literature on Icelandic provides the clearest examples of the separation of Case and case (here I rely on Maling (1990), Sigurðsson (1991), and Zaenen, Maling and Thrainsson (1985)).

Icelandic quirky case marking shows instances of NPs that get morphological case by virtue of being objects of certain verbs but are not necessarily licensed as objects by getting this case. (15a) contains an example of a double object verb both of whose objects get quirky case. The DATive object is optional. You can passivize the verb with just its GENitive object, as in (15b), but in this case the object must become the subject of the passive verb -- it may not stay in object position. I'll refer you to the literature on Icelandic for convincing evidence that the GEN must become a subject and is in fact a subject in (15b). Although the GEN NP gets genitive case as an object in (15b), this case does not license the NP in object position; quirky GEN case isn't abstract Case. Note that (15c) is consistent with the notion that it's the EPP, not the need for abstract Case, that is forcing the GEN NP to become a subject in (15b). If we add back the DAT argument in the passive in (15c), it satisfies the EPP by becoming the subject and now the GEN NP is licensed as an object. If we try to explain the obligatory movement of the GEN NP to subject position in (15b) by saying that the GEN NP lacks abstract Case as an object in the passive, we raise the question of why this NP can suddenly get abstract Case as an object in the passive in (15c) when there's a DAT argument around.

(15) a. María óskaði (Ólafi) alls góðs.
Mary-NOM wished Olaf-DAT everything-GEN good-GEN
b. þess var óskað.
this-GEN was wished
c. henni var óskað þess.
her-DAT was wished this-GEN

The examples in (15) illustrated how an NP could get (morphological) case without being licensed. In (16) we see the opposite situation -- a NP is licensed as an object without getting case. Icelandic has a number of verbs that show a DATive subject and a NOMinative object. One could claim that the NOM object is getting abstract Case from inflection, and in fact the verb may agree with a NOM object. But if tensed inflection with agreement is the source of NOM case on the objects of DAT subject verbs, we would expect the object to lose its NOM case in an infinitive, because infinitive inflection does not assign NOM. Instead, as illustrated in (16), such DAT subject/NOM object verbs still take a NOM object in infinitival constructions although there is no element around to assign NOM case.

(16) Ég tel henni hafa alltaf þótt Ólafur leiðinlegur.
I believe her-DAT to-have always thought Olaf-NOM boring-NOM

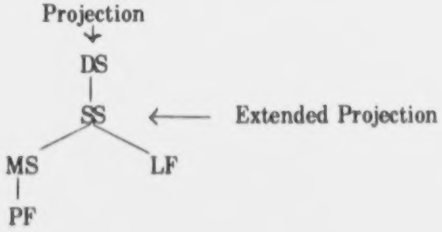
To review, Icelandic shows clear examples of NPs being assigned (quirky) morphological case in a position without being assigned abstract Case in that position and clear examples of NPs being assigned Case in a position without being assigned morphological case there. In short, the Icelandic facts argue for a clean separation of licensing and morphological case realization. The data we have examined lead us to suggest a grammar in which NPs are licensed via projection (and the EPP). Morphological case interprets the syntactic structures licensed by projection but does not itself figure into licensing.

Within such a grammar, we want ergative and accusative cases to be morphological cases whose very definition prevents them from being realized in certain syntactic configurations, those covered by the generalizations in (8).

IV. The structure of the grammar

I will assume a standard model of grammar as in (17), in which lexical properties are projected into DS and in which the Extended Projection Principle demands the presence of subjects at SS. This is a model without Case theory.

(17)



MS = "Morphological Structure"

The present paper is not the appropriate space in which to sketch an entire theory of morphology to go along with this picture of grammar (see, e.g., Halle (1991) for some discussion). For present purposes, I will assume that case and agreement morphemes are inserted only after SS at a level we could call "MS" or morphological structure. The presence of such case and agreement morphemes is a language particular option. Thus English has case only on pronominals while languages like Russian require a case suffix on every noun.

It's crucial that in this model, case and agreement are part of the PF branch of the grammar, an interpretative component. Government relations at SS determine the features of case and agreement morphology but the PF will find a way to interpret any well-formed SS. Syntactic ungrammaticality will not result from the realization of case and agreement. In particular, there is always a default case realization. If no principle or language particular property determines the case features for a case morpheme on a noun in a particular language, there will be default case features for the language that this morpheme will pick up.

I've been arguing for a principle like that in (18).

(18) Nominal arguments are licensed by (extended) projection, not by Case or by morphological properties.

The distribution of PRO immediately raises problems for this principle. The near complementary distribution between PRO and lexical NPs is summarized in (19). I put the "never" in quotations in (19) because, of course, there are often ways to realize lexical NPs as the subjects of infinitivals -- e.g., in English making them the object of the preposition "for" or placing the infinitival clause as the complement to an ECM (raising to object) verb.

(19) a. PRO is only licensed in the subject position of infinitivals.
b. Lexical NPs are "never" licensed in the subject position of infinitivals.

Another way to state this problem is that (extended) projection alone does not license PRO or pro. If projection were sufficient to license PRO, we should find PRO in the object position in (20a), since it could be projected and thus licensed there.

(20) a. *Elmer bought PRO.
b. Elmer preferred [PRO$_i$ to be given t$_i$ the bigger porcupine].

One might say that PRO is only projected as the subject of infinitivals, thus PRO is licensed via projection. However, (20b) shows that PRO can't be projected only in the subject position of infinitivals; PRO in (20b) is projected as an object and moves to subject position to satisfy the EPP. Thus PRO must be allowed to be projected into a position where it may or may not be licensed.

Extended projection also doesn't explain why lexical nominals are not licensed in subject position of infinitivals, as in (21).

(21) *Hortense tried [Elmer$_i$ to be given t$_i$ a porcupine].

Although (extended) projection doesn't determine the distribution of PRO, neither does Case theory in other approaches. The explanation for the distribution of PRO and lexical nominals is distributed among a few principles, as listed in (22).

(22) a. PRO theorem: PRO cannot be (lexically) governed
b. PRO does not need Case
c. Lexical NPs need Case

As Sigurðsson (1991) shows, PRO does in fact get morphological case in languages like Icelandic. Standard theories still require a stipulation that PRO doesn't need abstract Case as in (22b) and that lexical NPs do, as in (22c), in addition to the stipulation that PRO is an pronominal anaphor or whatever determines that PRO cannot be lexically governed, as stated in (22a).

We must admit that it is not (extended) projection that determines the distribution of PRO and the complementary distribution of PRO and lexical nominals. It is something about the S-structure position of PRO and lexical nominals that licenses PRO in environments where lexical nominals are impossible. Therefore, we need something that would be the RESidue of Case theory. Marantz (1984a, p. 85) gives one version of such a principle:

(23) The Surface Appearance Principle: A constituent X will appear in the surface structure tree by virtue of bearing a relation with respect to some item Y iff Y is a lexical item (i.e., not a phrase).

In Marantz (1984a), (23) insured that phonologically realized constituents had to be governed by lexical items or tense. PRO was precisely that NP that did not appear in surface structure, by virtue of not being lexically governed. Sigurðsson, (1991, p. 343) argues for a similar principle:

(24) Proper Head Government Condition: pro and lexical NPs in A-positions must be properly head governed.

And, of course, for Sigurðsson, PRO must not be properly head governed. For present purposes, we acknowledge that something remains of Case Theory besides projection theory, as stated in (25):

(25) RES(Case Theory): an NP argument is PRO iff not governed at S-structure by a lexical item or [+tense] INFL

Again, (25) acknowledges a role for S-structure or PF beyond the EPP in the licensing of arguments.

Small pro would seem to be licensed by the morphological properties of agreement, in contradiction to principle (18) (see the papers in Jaeggli and Safir (1989)). However, it is not the property of a particular agreement affix itself that is supposed to license pro on theories that tie the licensing of pro to agreement. Rather, it is the agreement system of a language as a whole that determines whether pro is licensed by agreement (see, again, Jaeggli and Safir (1989)). Still, since the licensing of pro is tied to an S-structure position (the position connected to AGR at S-structure) and not to (extended) projection by itself, the licensing of pro is also an exception to the generalization in (18).

To review, in a grammar without Case theory, (extended) projection plus independently required principles governing the distribution of PRO and pro license the appearance of NPs (DPs) in argument positions. Morphological case and agreement appear at MS, as part of the phonological component. The morpho-phonology of case and agreement interprets S-structure relations between constituents but does not determine the distribution of NPs in argument positions.

V. case realization at Morphological Structure

Recall that in the theory diagrammed in (17), case morphemes are added to stems at MS according to the morphological requirements of particular languages. When a word contains a CASE affix, this affix will acquire its particular case features according to the syntactic relations of its host stem at SS (assume that MS preserves all the syntactic relations of SS). Consider a noun that appears with a case affix at MS, as in (26a), because it's a morphological fact about the language in question that nouns require such affixes. To simplify matters, let's suppose that markers like NOM, ACC, ERG, etc. as in (26b) are the morphological features that the CASE affix is looking for.

What determines which of these features the CASE affix will acquire?

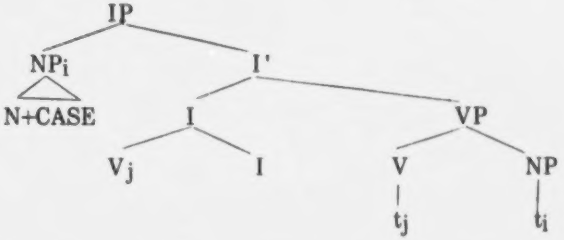
(26) a. N+CASE
b. CASE features: NOM, ACC, ERG, DAT, GEN, etc.

The CASE features on the affix will depend on which elements at MS govern the maximal projection of the N to which the CASE affix is attached (or which elements govern the DP that is headed by the D that governs the NP that is headed by the N in question). For the purposes of all syntactic principles, including the realization of CASE, the relevant objects at MS are not NPs per se but chains -- A-chains (argument chains) that include the traces of NP-movement. Thus the CASE features on the CASE affix may depend on what governs any link in the chain of the NP headed by the N+CASE.

(27) CASE features are assigned/realized based on what governs the chain of the NP headed by N+CASE

Given the principle in (27), consider an example of NP-movement as in (28). The chain of the subject NP is governed both by the V+I that governs the subject itself and the trace of the V that governs the trace of the subject. Either the V+I or the V, then, might determine CASE features on the CASE suffix.

(28)



In particular, if the verb in (28) realizes a quirky case, this case would be realized on the subject N because the verb governs a link in the subject's chain. It is principle (27) (taken with the disjunctive CASE realization hierarchy (29) to be discussed below) that accounts for the well-known preservation of quirky case in Icelandic passive and raising constructions. The chain of an NP involved in passive and raising will always be governed by the V of which it is a semantic argument; thus, this V may determine the CASE features on the NP no matter where the NP ends up at SS, MS, or PF.

The subject N in (28) looks like a candidate for at least three different CASEs. It might get quirky DAT CASE if the verb that governs the object position requires DAT. It might get ACC CASE since the object trace, part of the chain of the subject, is in object position. And it might get NOM case since part of its chain, the subject position, is governed by Inflection. As a matter of fact, we know that in such configurations, the subject will appear as DAT, not NOM or ACC, if the verb that governs its trace requires a quirky DAT CASE. And we know that the subject will never appear with (non-quirky) ACC. What insures these results?

Case realization obeys a disjunctive hierarchy that is typical of morphological spell-out, as discussed, e.g., in Halle (1989, 1991). The more specific, more particular case requirements win out over the more general, less particular case requirements. The hierarchy is roughly that in (29). Again, this is a disjunctive hierarchy: going down the list, as soon as a CASE affix finds some CASE feature that it is eligible for, it takes that CASE and leaves the list.

(29) case realization disjunctive hierarchy:

lexically governed case
"dependent" case (accusative and ergative)
unmarked case (environment-sensitive)
default case

Lexically determined case takes precedence over everything else, explaining the preservation of quirky case when an NP moves from a position governed by a quirky case verb to a position of NOM or ECM ACC case realization. "Dependent" case is what we will call accusative and ergative; dependent case will be explained immediately below. Unmarked case may be sensitive to the syntactic environment; for example, in a language GEN may be the unmarked case for NPs inside NPs (or DPs) while NOM may be the unmarked case inside IPs. Finally, there is a general default case in the language when no other case realization principle is applicable.

The universal availability of a default case realization mirrors the universal existence of default phonological "spell-out rules" for the phonological realization of morphemes. Disjunctive hierarchies with defaults are characteristic of the morphology (of the morpho-phonological component). A sentence will never be ungrammatical because no case features are assigned to a CASE affix; there will always be a default case realization. Thus case, like morpho-phonology in general, merely interprets syntactic structures and does not filter them.

VI. Dependent case

What now about ACC and ERG case, which I have called the "dependent" cases? ACC and ERG are assigned by V+I to one argument position in opposition to another argument position; hence ACC and ERG case on an NP is dependent on the properties not only of the NP itself but also of another NP position governed by V+I. We assume here that, when V moves and adjoins to I, the resulting V+I governs object positions that are governed by the trace of V either (i) directly (because the VP headed by the trace of V is no longer a barrier to such government), or (ii) because the antecedent of the trace is part of the V+I unit, or (iii) through the trace of V; for present purposes, we do not need to decide which combination of these possibilities is correct. ACC is the name for the dependent case that is assigned downward to an NP position governed by V+I when the subject position governed by V+I has certain properties. ERG is the name for the dependent case assigned upward to the subject position when V+I governs downward an NP position with certain properties. These certain properties are listed in (30a,b).

(30) Dependent case is assigned by V+I to a position governed by V+I when a distinct position governed by V+I is:
   a. not "marked" (not part of a chain governed by a lexical case determiner)
   b. distinct from the chain being assigned dependent case

Dependent case assigned up to subject:	ergative
Dependent case assigned down to object:	accusative

Condition (30a) is something of a stipulation as written. It prevents ACC case on an object if the subject is assigned a quirky case by a verb. There are ways of making (30a) follow from other principles, but they involve an investigation of quirky case that would take us beyond the concerns of this paper. (30b) simply clarifies what it means for the dependent case to depend on a *distinct* NP from the NP that gets dependent case. One link in a chain can't count as distinct from another link for the assignment of dependent case. Since case is assigned to chains, all the links are part of the same entity.

Condition (30b) explains why we couldn't get either ACC or ERG on the derived subject NP in (28). Both positions governed by V+I in (28) are in the same chain; thus there are not two distinct positions to set in opposition for the assignment of dependent case. On this theory, it is the definition of dependent case itself that explains the data covered by Burzio's generalization and the Ergative generalization in (8). A slight conceptual jump is required to see why Georgian, Hindi, and Basque can get ERG case on the subject of an intransitive verb when the subject is not raised from an object position -- i.e., when the verb is unergative (subjects of unergatives can bear ergative case, unfortunately for the terminology). In the case of normal intransitives, the object position will be empty and thus available to count as the distinct "unmarked" position in opposition to which ERG case may be realized. Should an unfilled position be considered visible for the realization of dependent case? Apparently Georgian and Basque obligatorily count such an unfilled position as visible while Hindi, which shows optional ERG on the subjects of intransitives in the perfect, only optionally "sees" such an unfilled position. So-called "ergative" languages such as Inuktitut that never allow ERG on the subject of an intransitive verb, either unergative or unaccusative, apparently never consider an unfilled position as a distinct position for the realization of dependent case.

The definition in (30) explains the situations in which the generalizations in (8) seemed appropriate. It looks like ACC case can't be assigned when there's a non-thematic subject because in most situations in which there's a non-thematic subject, an NP governed by V+I raises to this non-thematic subject position and thus the subject and object positions are filled by members of the same chain. Similarly, ERG case will not generally be assigned when an NP moves into a non-thematic subject position because again the subject and object positions will belong to the same chain. Although the examples in (11-13) violate (8a), they are consistent with the definition of dependent case. Although these sentences have non-thematic subject positions, the derived subject and the NPs getting ACC case are in distinct chains, allowing for dependent case assignment.

The present approach to dependent case should be distinguished from superficially similar approaches that use case hierarchies for the distribution of cases within a clause (see, e.g., Yip et al. 1987) or that rely on notions of dependent case requiring that one case be assigned in a clause only after some other case is assigned or realized. On the present theory, although the CASE feature in an NP may depend on syntactic properties of other NPs in a clause, CASE in an NP does not depend on the CASE features in other NPs. Thus the assignment of dependent case does not depend on the previous assignment of NOM or some other "independent" case but rather on the existence of an independent argument position with certain syntactic properties. ECM clauses such as, "I consider [him to have discovered her too late]," in which both the subject and object receive ACC dependent case (the subject from a higher V+I), show that ACC in a clause does not obviously depend on the prior assignment of NOM in the clause. The hierarchy in (29) serves to determine the CASE features for an individual CASE affix; it does not serve to distribute cases through a clause. Thus this hierarchy reverses what might be expected for a hierarchy of cases for a clause; for a particular NP, dependent case (ACC) takes precedence over independent case (NOM).

VII. Split ergativity between case and agreement

On the theory under discussion, AGR is a morpheme added to I at MS for those languages that demand morphological agreement to create a well-formed inflected verb as a word; agreement, like case, is a morphological property of certain syntactic categories of words in certain languages. While the CASE morpheme picks up case features keyed to the syntactic environment of the NP with which CASE is associated, AGR picks up person and number features from NPs governed by the V+I that AGR attaches to. Although the features on CASE and AGR reflect similar syntactic relations, the actual determination of these features depends on potentially idiosyncratic properties of governors such as particular tenses in I or quirky case requirements of Vs. It is not necessary that the governing properties of a particular tense in I that determine, for example, that dependent case will be assigned upward (=ERG case) correlate with a particular property of the AGR on that I that determines that AGR will pick up the features of the ERG NP or of some other NP. Thus the theory leaves open the possibility of split ergative systems, like that described above in Georgian, for which the ERG-NOM patterning of case with certain tenses does not correlate with a NOM-ACC pattern in the agreement system.

Assuming that an AGR morpheme on V+I picks up the features of an NP (DP) that is governed by V+I, the question, of course, is which NPs governed by V+I determine the person and number features of AGR. Here, the story is very similar to that given for the determination of CASE features above. In particular, there is dependent agreement, unmarked agreement, and of course, default agreement that stand in the same disjunctive hierarchy as dependent, unmarked and default case as in (29) (I leave open here the issue of what "lexically-governed" AGR might be). Dependent AGR picks up features of one NP governed by V+I in opposition to a distinct, unmarked NP also governed by V+I, where the definitions of distinct and unmarked are as in (30b,a). Dependent AGR with the subject in opposition to an object position we might call "ergative" AGR while dependent AGR with an object in opposition to a subject we could call "accusative" AGR. Unmarked agreement would be with any NP governed by V+I. Finally, default agreement would provide a set of person and number features for AGR when V+I does not govern any NP (or perhaps, any "unmarked" NP in the sense of (30a)).

We saw above that CASE in Georgian depends on the series of the tense/aspect in I(NFL). Series I INFL assigned dependent case downward, yielding a NOM-ACC(=DAT) pattern, while series II INFL assigned dependent case upward, yielding an ERG-NOM pattern. Regardless of the case-determining properties of INFL, the AGR on V+I in Georgian has its own properties and works the same way across the board. In particular, the AGR in V+[I+AGR] triggers dependent up agreement, coupled with unmarked and default agreement, as shown in the disjunctive hierarchy in (31) -- again, since this is a disjunctive hierarchy, AGR will leave the hierarchy as soon as it picks up features from an eligible NP.

(31) Georgian suffixal AGR on I:

dependent up (picks up the features of an unmarked NP in subject position in opposition to a distinct NP position governed by V+I)
unmarked AGR (picks up the features of an unmarked NP governed by V+I, but only the person features of a (3rd person) NP inside the VP)
default AGR (if no NP is governed by V+I, the AGR is 3rd person singular)

The one notable peculiarity of the Georgian AGR in (31) is that it will not agree in number with a (3rd person) NP that is VP internal, i.e., when AGR governs this NP downward (for example, when there's a DAT -- "marked" -- NP in subject position).

On the theory under discussion, canonical "subject agreement" is a combination of dependent agreement upward and unmarked agreement, as in (31). Subjects of transitive clauses would trigger dependent agreement, while subjects of intransitives and objects of verbs with "marked" subjects (e.g., quirky case-marked subjects) would trigger unmarked agreement.

Since the subject that gets ERG in Georgian series II sentences and the subject that gets NOM in series I sentences are equally unmarked in the relevant sense, the AGR described in (31) will pick up the person and number features of both sorts of subjects. Since DAT subjects are marked in the relevant sense, this AGR will not pick up the features of a dative subject but will pick up the features of a NOM object instead.

Again, the agreement properties of Georgian AGR hold across the series I Inflections that assign dependent case downward and the series II Inflections that assign dependent case upward. There is no reason to expect a correlation between the "directional" features of INFL for case marking and the "directional" features of AGR for agreement. Split ergativity of the Georgian sort simply exploits this lack of correlation.

We have seen that the work of Burzio's generalization could be split between the definition of dependent case and the requirement for sentential subjects encoded in the EPP. Making the realization of morphological case and agreement explicitly depend on government relations at SS allowed for the complete elimination of Case theory as involved in the licensing of NP arguments or the spell-out of case or agreement. Licensing now generally follows from the semantic to syntax interface and the subject requirement of the EPP. The theory that results from abandoning Case theory and fleshing out the realization of morphological case has the added advantage of providing an explanation for the Ergative generalization in (8) and the connection between the Ergative and Burzio's generalizations.

FOOTNOTES

[*] This is a lightly revised version of the talk I read at the ESCOL conference; since the paper was written as a talk, I invite the reader to read it out loud to herself. I thank audiences at ESCOL and at Cornell for helpful comments and Germán Westphal for his patience.

[1] The series of the tense is indicated by a roman numeral on INFL (=tense); I follow Harris's (1981) presentation of tense "series" and verb "classes."

[2] Or that expletive subject constructions have their own peculiar semantics and thus must be projected directly in DS as expletive subject sentences.

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ESCOL '91 254-264

INFORMATION STRUCTURE, PARAMETERS, AND WORD ORDER

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1 Principle-Based Parsing

A cognitive approach to natural language processing requires that the grammar used by the parser is well-founded in linguistic theory. Parallel to the shift of linguistic theory from a uniform collection of structural descriptions and structural transformations to a system of principles and parameters, parsing theory has developed the so called *principle-based* parsing approach (Barton 1984, Berwick and Fong 1990, among others). This approach assumes that the principles are stated as axioms in the theory of grammar and they must be used as axioms by the parser. A theorem is the *(pre)compilation* off-line of the interaction of some of the principles. Principle-based processing in its strictest sense prohibits grammar compilation and the use of grammar theorems. Such parsers are, simply, very inefficient. A parser which mirrors a modular theory of grammar, such as Government-Binding (GB) theory (Chomsky 1981, 1986a,b), must fulfill apparently contradictory demands: for the parser to be explanatory it must maintain the modularity of the theory, while for the parser to be efficient, modularization must be minimized so that all potentially necessary information is available at all times. We explore a possible solution to this contradiction, which is based on some simple observations concerning the structure of linguistic theory.

2 Some Observations on the Structure of Linguistic Theory

First, we observe that in a modular linguistic theory the interaction of some of the principles expands the working space of the parser, while the interaction of other principles restricts the working space of the parser. For example, the interaction between $\overline{X}$ theory and categorial information increases the numbers of licit phrase structure rules that the parser might need to consider in recovering phrase structure, while the interaction between $\overline{X}$ theory, categorial information and restrictions on cooccurrence of categories in phrase structure rules (C-selection) reduces the number of licit phrase structure rules. This is exemplified schematically in Table 1.

The first conclusion is, then, that in designing an efficient modular parser, the interaction between multiplying principles should be kept to a minimum, while the interaction between restrictive principles should be maximized.

Second, we observe that each principle of the grammar which according to linguistic theory constitutes a separate module, can be decomposed into

Uninstantiated Rules

x1 ::= x0 y2
x1 ::= y2 x0

Partially Instantiated Rules

c1::= c0 n2   c1::= c0 v2
c1::= n2 c0   c1::= v2 c0
c1::= c0 i2   c1::= c0 p2
c1::= i2 c0   c1::= p2 c0

$\overline{\text{X}}$ Rules and Categorial Selection

c1::= c0 i2   c1::= i2 c0

Table 1: Interactions between Modules

Empty Category Principle (Rizzi 1990)

- Configuration condition: domain of a head
- Substantive condition: head ∈ { A,Agr,N,P,T,V }
- Locality condition: no intervening barrier or head

Table 2: The Structure of a Linguistic Principle

separate pieces of information, each of which can be computed independently of the others. Following a suggestion by Rizzi 1990:24, we can observe that principles of GB theory tend to have the structure shown in Table 2, where the ECP is used as an example.

According to Rizzi 1990:24, the ECP must satisfy a configuration condition, a substantive condition and a locality condition conjunctively. This is a single filter in the theory of grammar, but in the parser it can be computed in *pieces*, so to speak. In this particular example, a possible division of labour would precompute the licit configuration in a parse table, would impose locality condition by limiting the size of the push-down storage, and would check the condition on lexical features as a precondition to an assignment of the feature $\pm\gamma$. In sum, our second observation is that principles of linguistic theory can be decomposed into smaller pieces, which can be computed independently of each other. A problem that can be decomposed into independent subproblems, can be solved efficiently, because it can be solved with a divide-and-conquer technique.

Our third observation regards the kinds of linguistic information that occur in the principles of grammar and that can be computed independently of each other. On inspection of the theory we classify linguistic information into 5 different classes: configurations; lexical features; syntactic features; locality conditions; referential indices.

- Configurations: sisterhood, c-command, m-command, ±maximal projection
- Lexical features: ±N, ±V, ±Funct, ±degenerate, ±c-selected, ±Strong Agr
- Syntactic features: ±Case, $\pm\theta$, $\pm\gamma$, ±barrier
- Locality information: minimality, binding
- Referential information: indices, ±anaphor, ±pronominal

This partitioning forms natural classes on the basis of *informational content*. We can capture in the parser the fact that the features that form the linguistic vocabulary fall into these classes by having each of these classes be represented in the parser by a different operation and each operation correspond to a data type. Moreover, we can use this classification to provide a precise specification for the problem stated above, of what modularity must be retained in the parser, without making it hopelessly inefficient. The third observation leads to the claim that precompilation of principles need not be banned altogether, (*contra* strict principle-based parsing) as long as the amount of precompilation allowed in the parser is clearly specifiable and such specification provides a clear relation to competence theory. Following Berwick 1982:400ff, we believe that modularity is efficient only if modules that depend on each other are collapsed, while independent modules are not. Our partitioning of linguistic features into Information Content Classes enables us to define the notion of *dependent* and *independent* in a way that makes precise predictions for the design of the parser as we show in the next sections.

Definition 1 Dependent *Primitives that belong to the same Information Content Class are dependent.*

Definition 2 Independent *Primitives that belong to different Information Content Classes are independent.*

3 Word Order Parameters

We show in this section how the observations and definitions of the previous section are applied to the design of an algorithm for word order distribution. We argue in favour of precompilation of the features that encode word order according to an algorithm, instead of providing the word order as a primitive in the language-dependent grammar.

Travis 1984:28 notices that to construct a phrase marker for an input string a grammar of rewrite rules is needed that must be able to compute the following pieces of information.

(1) 1. Which elements are obligatory in the phrase marker.
2. Which elements are optional.
3. What order the optional elements must have to one another.
4. What order they must have in relation to the head.

Since GB is a theory of principles, it does not encode all this information in the phrase structure rules explicitly, but rather it factors out the principles that derive the necessary information into modules of the grammatical system. $\overline{X}$ theory determines the obligatory elements in a maximal projection, namely the heads, and it also determines that there can be optional specifiers and complements. Complements of each given lexical head are listed in the lexicon in the subcategorisation frame because they vary with each word. Specifiers are licensed by predication. The questions about word order, as stated in ((1).3,4) above, are settled by directionality of θ-assignment and by the ordering relation inside a maximal projection, as established by $\overline{X}$ theory.

Travis 1984 presents interesting synchronic and diachronic evidence from Chinese to show that three kinds of parameters are needed to explain word order phenomena fully. A parameter for the direction of Case assignment, a parameter for the direction of θ-assignment and a parameter for the headedness of maximal projections, namely whether they are head-initial or head-final, are all needed. She discusses evidence from Archaic Chinese (AC) and two stages of Modern Mandarin (Mandarin1 and Mandarin2).

4 The Problem and Some Solutions

In Travis's account, several modules of GB theory cooperate to build phrase structure. This approach to word order incurs an empirical problem: it predicts that all possible combinations of the parameters should occur. Given that word order can be described by 3 binary parameters, 8 possible word orders should arise. But this is not the case. Only 6 word orders are attested. Given the possibilities in Table 3 for the setting of the parameters, the word

Parameters of Word Order			
	Headedness	θ-direction	Case-direction
a.	final	left	left
b.	final	left	right
c.	final	right	left
d.	final	right	right
e.	initial	left	left
f.	initial	left	right
g.	initial	right	left
h.	initial	right	right

Table 3: Possible Word Orders

	Word Order				Language
a.	PP2	PP1	O	V	Japanese
b.	PP2	PP1	V	O	Mandarin2
c.	PP2	O	V	PP1	*
d.	PP2	V	O	PP1	Mandarin1
e.	PP1	O	V	PP2	Kpelle(past)
f.	PP1	V	O	PP2	*
g.	O	V	PP1	PP2	Kpelle
h.	V	O	PP1	PP2	English

Table 4: Actual Word Orders

orders shown in Table 4 could arise. (In the table, PP1 refers to selected complements, while PP2 refers to non-selected complements.)

Travis 1987, 1989 Travis notices that the two orders that do not arise differ qualitatively from the others in that they could only be specified by assigning a value to all the three parameters, while only two parameters are necessary in the other six, existing cases. The reason for this gap in the paradigm is, she claims, to be found in the fact that natural languages do not have counting predicates. Hence, although three parameters exist, they can never be used together. This explanation, however, is not convincing. There is no apparent reason why setting a parameter should imply counting it. The parser/generator could just set all the parameters one by one without counting them while doing so. Travis 1989 elaborates on this proposal. Word orders are described by the following assumptions:

(2)
1. Only one subdomain parameter can be set at a time.
2. Only the headedness parameter can vary per category.
3. If a subdomain parameter is specified
   - (a) nothing else can be specified
   - (b) the non specified parameters have both options. If the head is set it must be consistent across categories.
4. If no subdomain is specified, then the headedness must be set and everything else follows. This value may vary across categories.

This set of assumptions captures most of the word orders with only one parameter being explicitly set per language. But it still fails to rule out the unattested orders. For example, if the direction of θ-assignment is the set parameter, then the headedness parameter will have the opposite value and the case parameter can have both values, but then the unattested orders can be generated. For instance, if θP is set to *right*, then HP is *left*, and KP can be both *left* and *right*. Moreover, this approach is unconvincing on theoretical grounds. Travis 1989 claims that this strong interaction between parameters is welcome from the point of view of learnability. However, it is not clear, as Fodor and Crain 1990 point out, that this kind of argument is relevant here, as the interactions are not within a single language here, but they constrain the generative power of the theory. From the theory point of view, the strongest theory is the one that with the smallest number of parameters can generate most languages. We agree with this criticism, and we believe that parameters should be set independently.

An alternative that differs both from Travis's and from ours could claim that the generalisation to rule out the non-attested word orders is stated in the grammar as a disjunctive filter. Notice that the word orders that do not occur are those that group NPs and PP2s as a set opposed to PP1s. The set that contains NPs and PP2s can be defined only by a disjunctive definition, such as *Those phrases that are Case marked or do not receive a θ-role*. Disjunctive universals, we know, are not really universals, because they amount to admitting that the exact nature of the generalisation is not known. If the generalisation were stated in the competence grammar, stating such a universal as an output filter on word orders of natural languages would be the only possible approach.

5 A Solution

We propose a different approach. We impose no restrictions or output filters on the grammar, which is allowed to overgenerate, and thus generate also the word orders that are not attested. We claim that the distribution of word orders is a result of constraints on the algorithms that compute phrase structure. The three parameters that we are going to consider belong to different modules in the theory of grammar, but because they belong to the same Information Content Class (***configurations***), since they are directionality parameters, they are precomputed in the phrase structure rules.

According to the observations above, on the relation between Information Content Classes and modularity, we notice that the algorithms must have the following features: parameters can constrain each other; information related to the distribution of feature assignment, for instance ±Case, should not interact with structural information, such as phrase structure rules; all parameters are set independently.

The actual algorithms that generate word orders are presented below and discussed in the following section. The input to the algorithms are parameters and the output is the linear order of the phrases in the given language.

Algorithm 1

```
1. set HP = left or right
2. set $\theta$P = left or right
3. if $\theta$P $\neq$ HP then attach $\theta$ complement(s) on $\theta$P side.
4. attach remaining complement(s) on HP side
```

Algorithm 2

```
1. set KP = left or right
2. if KP $\neq$ HP then move object on the KP side (unless already there)
```

6 Comments on the Algorithms

There are four possible inputs to Algorithm 1, which produce four distinct outputs, shown in Table 5.

We illustrate here the computation of (5b). The headedness parameter is set to *right*, which means that the head is initial and all the other complements are to the right of the head. Now the word order is V O PP1 PP2.

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	HP	θP	Output
a.	left	left	PP2 PP1 O V
b.	right	left	PP1 O V PP2
c.	left	right	PP2 V O PP1
d.	right	right	V O PP1 PP2

Table 5: Output of Algorithm 1

	HP	KP	θP	Output
a.	left	left	left	PP2 PP1 O V
b.	left	right	left	PP2 PP1 t_i V O_i
c.	left	left	right	PP2 V O PP1
d.	left	right	right	PP2 V O PP1
e.	right	left	left	PP1 O V PP2
f.	right	right	left	PP1 O V PP2
g.	right	left	right	O_i V t_i PP1 PP2
h.	right	right	right	V O PP1 PP2

Table 6: Output of Algorithm 2

Then the direction of θ-assignemt is computed: θ-roles are assigned to the left. θ-complements, namely the object and selected prepositional phrases, are attached to the left. Non θ-assigned complements stay on the right of the head. In the instance of (5b), this gives rise to the order PP1 O V PP2.

Given the four word orders at the output of Algorithm 1, when Case directionality (KP) is computed by Algorithms 2, eight outputs are generated. Two pairs of outputs though will be indistinguishable, so only six different word orders are actually generated. This is shown in Table 6. Consider for instance (6b). The headedness parameter is set to left, *i.e.* final, all complements are on the left, θP is also left, so the output of Algorithm 1 for this pair of values corresponds to (5a), PP2 PP1 O V. KP is *right*, so the object is positioned to the right of the verb, yielding PP2 PP1 V O.

Now consider (6c) and (6d). In (6c) HP is *left* and θP is *right*, so the output of Algorithm 1 is given in (5c), PP2 V O PP1. Case assignment is to the left so nothing happens and the output order of Algorithm 2 is the same as the input order. In (6d) HP is also *left* and θP is also *right*, so Algorithm 1 produces the output illustrated in (5c). This becomes the input to Algorithm 2. Since KP is different from HP, namely its value is *right*, clause 2 of Algorithm 2 can apply. It applies vacuously, because the direct object is already on the right of the verb. The other cases behave analogously. These algorithms, as can be checked, are descriptively adequate. We will discuss below why these algorithms are to be preferred to other descriptively adequate algorithms.

7 Alternatives and Free Phrase Order Languages

According to Algorithm 2, clause 2, parameters are set even when they will be disregarded in the computation, as in the case when KP equals HP. This in turn implies that parameters are set independently, which is the strongest interpretation of a theory of parameters; and also that the computation of phrase structure rules has no knowledge of other principles in the grammar.

Another plausible alternative would still make the correct empirical predictions for these word orders, but not obey our restrictions on the precomputation of primitives, which can be viewed as a requirement of information encapsulation. One could imagine that the Case module can *see* the value of the headedness module and only set the parameter if it is going to be different from HP.

Firstly, for the Case parameter to choose not to be set in certain instances, it would mean that the module which computes word order would have to have knowledge about the Case Filter. Otherwise, it would not know that some of the word orders will be incorrect. And this violates our restriction on precomputation of information, because the Case Filter regulates assignment of syntactic features, thus it should not be active when computing phrase structure.

A more compelling argument against this alternative, however, is empirical. We notice that in this alternative scenario, the Case parameter would not b set. How do we interpret the notion of *not setting a parameter?* A parameter that is not set can take all the possible values available for that parameter. Parameters are viewed as *filters*, and if no parameter is set then the computation is less restricted (for a similar idea, developed independently, see also Kashkett 1991).

From the point of view of linguistic theory, this interpretation of the notion of *non-set parameter*, takes sides with those approaches that do not allow the existence of *configurationality* parameters and allows a homogeneous treatment of all languages. If we assumed that non-set parameters are simply not available, then a language with no directionality parameters would be logically possible. This theoretical choice, though, would be more expensive, because free word order languages and fixed word order languages would have to be captured by unrelated mechanisms. We prefer, then the first alternative.

As an example of such languages, consider Warlpiri, which is an Aboriginal Australian language that exhibits extensive freedom in the ordering of phrases within a sentence. Phrases in a sentence can surface in all possible permuta-

	HP	KP	θP	Output
a.	left	left	left	PP2 PP1 O V
				PP2 O PP1 V
				PP1 PP2 O V
				PP1 O PP2 V
				O PP2 PP1 V
				O PP1 PP2 V
b.	left	right	left	PP2 PP1 t_i V O_i
				PP1 PP2 t_i V O_i
c.	left	left	right	PP2 O V PP1
				O PP2 V PP1
d.	left	right	right	PP2 V O PP1
				PP2 V PP1 O

Table 7: Warlpiri

tions without affecting the meaning. All the 24 possible permutations of the 4 phrases in (3) (from Simpson 1983) are licit and semantically equivalent.

(3) Nangala-rlu +rla yu-ngu pipa Jangala-ku
Nangala-ERG +DAT give-PAST book-ABS Jangala-DAT
'Nangala gave the book to Jangala'

All the possible phrase permutations are then generated in Warlpiri with the same mechanism that generates only the correct array of word orders in other natural languages. This is shown in Table 7.

8 Conclusion

We have observed that the structure of linguistic principles can be usefully exploited to impose restrictions on the design of a parser, which lead to explanatoriness, because the parser retains a transparent relation to the theory of grammar, without at the same time forcing the parser to solve complex problems, thus arguably leading to an efficient design. We have shown that this same set of assumptions is predictive, in that it enables us to choose between empirically equivalent parsing designs.

Acknowledgments

This work has benefited greatly from discussions with Bonnie Dorr, Paul Gorrell, Suzanne Stevenson, and Amy Weinberg, among others.

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ESCOL '91 265-276

CLAUSAL ADJUNCTS AND TEMPORAL AMBIGUITY

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0 Introduction

This paper discusses some problems which arise from an null operator analysis of temporal ambiguity in clausal adjuncts. Given the phrase structure of the clausal adjuncts, certain predicted ambiguities do not arise. I show how the operator analysis can be maintained and in fact provide further evidence for it by accounting for the lack of ambiguity in terms of interactions of multiple operators at LF.

Larson 1990, following Geis 1970 proposes a movement analysis for the ambiguity of sentences involving certain temporal prepositions as in (1).

(1) a. I saw Mary in New York before [$_{S1}$ she claimed [$_{S2}$ that she would arrive]]
b. I saw Mary in New York after [$_{S1}$ she swore [$_{S2}$ that she had left]]
c. I couldn't leave until [$_{S1}$ John said [$_{S2}$ I could leave]]
d. I haven't been there since [$_{S1}$ I told you [$_{S2}$ I was there]]

Each example is ambiguous with respect to the interpretation of the temporal preposition — the main clause in each sentence can be interpreted as relating either to the time of the clause marked S1 or to the clause marked S2. Thus (1d) for example, can be interpreted as *I haven't been there since the time of my telling you* or *I haven't been there since the last time I was there.*

Larson assumes the structure of the clausal prepositions to be (2) and attributes the ambiguity in (1) to the movement of a null temporal operator from a position inside either S1 or S2.

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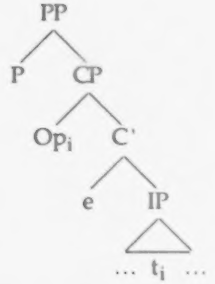
[*] Thanks to N. Hornstein, D. Lebeaux, C. Schmitt and J. Uriagereka for their comments and suggestions.

(2)



Supporting this analysis is the fact that the ambiguity is sensitive to islands as the examples in (3) show: in neither case is the lower clause reading available:

(3) a. I haven't been there since I made the claim that I was there
b. I haven't been there since you asked whether I was there

The main claim of Larson's proposal is that the class of clausal prepositions which allow the long distance reading are exactly those which select for both NP and CP. Under the assumption that the operator chain must be case-marked to be visible at LF, the clausal P can case mark mark the operator just in case it can select NP. In this way Larson derives the lack of a long distance reading in *while* clauses as in (4), the one temporal preposition which does not select both NP and CP.

(4) John left while Bill said Fred was leaving

Larson crucially assumes that the phrase structure of the PP adjunct is as in (2), with the P selecting a CP complement. This is important for him in two respects: first it provides a site for the null operator to land (the Spec C' position) and second it allows the operator to be case marked by the preposition, accounting for the relationship between multiple selection and ambiguity.

1 The phrase structure of the adjunct

There is very little evidence, however, for this particular phrase structure. Instead the phrase structure involves the structure P IP with the P acting as a Comp as discussed by Emonds 1985. With this phrase structure, Larson's analysis becomes more difficult maintain.

There are two arguments against the P CP analysis. The first due to Emonds is simply that overt complementisers never appear in clausal PPs, nor can overt *wh*-elements as in (5):

(5) a. *John left before that Bill left
b. *John left before when Bill left

Since complementisers in English are usually optional, and often obligatory, Larson needs to stipulate that the lack of complementiser is a surface PF filter.

A second, and more substantial argument comes from the analysis of parasitic gaps. As discussed by Chomsky 1986, parasitic gap constructions likely involve the movement of a null *wh*-operator to a Comp position inside the adjunct. This chain is then composed under some locality condition with the chain containing the over *wh*-operator. Assuming this analysis is basically correct, it provides support for the P IP analysis of clausal PPs.

A parasitic gap in the subject position of the clause immediately dominated by the preposition:

(6) *Which book did you read *t* after *e* was reviewed in the *Times*

If the subject is embedded more deeply, then the gap is licensed:

(7) Which book did you read *t* after Bill said *e* was reviewed favourably

Under standard analyses of parasitic gaps, this contrast is unaccounted for—there are no principles which should rule out (6) assuming the structure in (8):

(8) Which book did you read [$_{PP}$ after [$_{CP}$ Op$_i$ [$_{IP}$ e$_i$ was reviewed ...]]]]

If we assume the P IP structure, the facts can be easily accounted for. Given the lack of a CP, the null operator in a parasitic gap construction must move to the Spec PP position. Assuming the operator moves to the Spec PP position, then the ungrammaticality follows directly as an instance of a *that*-trace violation, attributable to the ECP, given the structure in (9)

(9) Which book did you read $[_{PP}$ Op_i $[_{P'}$ after $[_{IP}$ e_i was reviewed ...]]]]

The contrast between (6) and (7) is explained by the fact that intermediate traces do not yield *that*-trace violations (Lasnik & Saito 1984), thus in (7) there is no ECP violation.[1]

Given that the P CP analysis is untenable, then Larson's analysis would have to be modified to the P IP structure. Following the analysis of parasitic gaps outlined above, the null temporal operator which Larson posits would need to move to the Spec PP position. Adopting this analysis would then remove the motivation for the multiple selection effect. Although there are independent problems with the idea of multiple selection which make it undesirable (for details see Munn (in progress)), the correlation which Larson makes between the case marking properties of the clausal preposition and the ability to license the null operator is an interesting one which needs to be accounted for.

2 The nature of the null operator

Larson is not explicit about the nature of the null operator, so I shall assume that it is a null *when*. Larson 1985 analyses *when* as being intrinsically case-marked, so it is not exactly clear that its null counterpart should not be so too. This removes some of the force from the visibility condition, although it could easily be stipulated that only lexical elements can have inherent case.

Larson attempts to derive the fact that there is no long distance reading with *while* from the fact that *while* does not select NPs and thus does not casemark. I believe that this fact is unrelated to the case marking properties of *while*, but rather to the semantics of *while* and *when*.

Assuming that the null operator is a null *when*, then it should have the semantics of *when* or its non-WH counterpart *then*. These elements pick out points in time, not durations[2]. Thus, as an answer to the question in (10) you can answer (10a) but not (10b). Similarly, *then* denotes a point in time, roughly *at that time* rather than *during that time*.

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[1] I assume that further extraction out of the PP is barred because it is not head governed. (c.f. Aoun et al 1987, Rizzi 1990)

[2] I use this descriptively. Bennett & Partee 1972, Dowty 1979 argue that the primitive for the semantics is an interval. Thus *when* specifies a *moment* in that system, i.e. [t, t] which specifies the set {t}.

(10) When did you live in Paris?
a. in 1989
b. *for three years

While, on the other hand, specifies a relation between an event and a durational event; it cannot relate durational events to punctual events or two punctual events. Thus you cannot say (11a) assuming that *Bill died* is punctual.

(11) a. *John sang a song while Bill died
b. John sang a song while Bill kissed Mary

In fact if the predicate is non-durational it receives a durational or repetitive interpretation as in (11b). A parallel example of this is *during*. Although during selects NPs, those NPs must denote durational events, thus (12b) is only interpretable under the reading of Bill dying a slow death (if at all). This contrasts with the other temporal prepositions which relate points in time, even though they too must be interpretable as eventive if they are NPs (12b).

(12) a. John sang during Bill's death
b. John left before Bill died/Bill's death

If the event is durational it's interpretation with a temporal adverb picks out a salient point in the event. In the case of clausal complements, the conjunction picks out a salient point in the aspect of the predicate as the examples in (13) show.

(13) a. John left after Bill died (end-points of achievements)
b. John left after Bill ran (started running)
c. John left after the party (ended)
d. John left before Bill died (end point)
e. John left before Bill ran (started running)
John left before the party (started)

The exceptional cases are the NP cases which seem to be dependent on the PP itself. The cases with the clausal complements depend on the aspect of the clause, rather than on the PP; if *before* selects an NP, the interpretation is the beginning of that event (*Bill left before the party*). *While*, therefore, picks out durational events rather than aspectual points of events.

Given this fact, it is not surprising that *while* cannot support the long distance reading, since the null *when* can only bear a punctual reading not a durational one. Independent of case reasons, *while* is incompatible with *when*.

A corollary to this is the impossibility of Antecedent Contained Deletion (ACD) with certain case assigning temporal PPs. Larson 1987 analyses cases such as (14) as involving ACD of the I' following the clause. He contrasts the fact that with *when* you cannot get ACD, as in *John left when Bill*, on the assumption that *when* cannot assign case to *Bill* but *after* and *before* can.

(14) a. John left before/after $[_{IP}$ Bill $[_{I'}$ e]]
Case——^
b. *John left when Bill

These are not the only cases, however, of case-assigning temporal PPs. Since the temporal prepositions *since* and *until* select both S and NP, they support the long distance reading because they can casemark the operator according to Larson. This predicts that they should also undergo ACD, but this is not the case as the examples in (15) show, even though their non-elided counterparts are grammatical:[3]

(15) a. *John sang a song until Bill
John sang a song until Bill did
b. *John has been singing since Bill
John has been singing since Bill has been

Given these two facts, there is a contradiction. If *since* can casemark the null operator, then it should also be able to casemark the remains of ACD. If on the other hand there is a semantic reason for not being able to ACD with *since* or *until* independent of their case marking abilities, then there is also a semantic reason for why *while* cannot accept the long distance reading independent of case marking. The correlation between the case assigning properties and the operator visibility is nebulous at best.

We therefore adopt the null operator to account for the temporal ambiguity, but with the revised structure in (16). Assuming this structure and the operator analysis raises some interesting problems for the operator analysis, which I shall attempt to solve.

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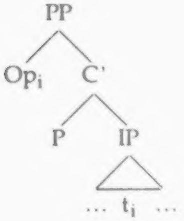
[3] A similar contrast shows up with the comparative *as* which can support the ACD, even though the temporal *as* cannot. Temporal *as*, having a semantics similar to *while* similarly does not support the long distance reading.

(16)



3 Missing ambiguities

Independent of the phrase structure in (16) there are a number of cases, not discussed by Larson, in which the ambiguity of temporal interpretation does not arise. In the remaining part of the paper I account for the missing ambiguities in terms of interaction of multiple operators. This allows us to preserve the movement approach to the ambiguity, which seems to be well-motivated.

First of all, if an quantifier binds into the root clause[4] of the temporal adjunct, then the long distance reading becomes unavailable as in (17a). The ambiguity reappears, however, if we bind a pronoun in the both the embedded clause and the root clause as in (17b) or simply in the embedded clause alone as in (17c)[5]

(17) a. *Every man$_i$ left after he$_i$ said Bill [left t]
b. Every man$_i$ left after he$_i$ said he [left t]
c. Every man$_i$ left after Bill said he$_i$ [left t]

Intuitively, it seems that the bound pronoun extends the domain of the quantifier into the adjunct and then interacts with the operator chain formed by the temporal operator. Following Pesetsky 1982 and May 1985 we might assume a path theoretic account of (17). Pesetsky proposes that A-bar movement creates a 'path' from the maximal projection dominating the trace to the maximal projection of its operator. Conditions such as the ECP can then be stated in terms of a single well-formedness condition on paths. The Path Containment Condition, informally stated in (18), states that intersecting paths must not overlap unless one includes the other.

---

[4] I shall use the term 'root' clause to refer to the clause immediately selected by the clausal preposition and refer to any clause lower in the adjunct as the 'embedded' clause.

[5] Some speakers find (17b) better than (17c). This may be because bound variable binding is sensitive to the Specified Subject Condition, ruling out a bound reading for (17c) altogether. If there is no bound reading (17c) is irrelevant to the discussion.

(18) Path Containment Condition (PCC) (Pesetsky 1982)

If two paths overlap, one must contain the other

Since the quantifier *every man* in (17) raises at LF, it creates a path from its trace to the root clause. Given that the the bound pronoun creates a bound variable at LF, it follows that the path formed must extend to the maximal projection dominating the bound pronoun. This is shown schematically in (19).

(19) $[_{IP0}$ Every man$_i$ $[_{IP1}$ t_i … $[_{IP2}$ he$_i$ … (path extends to IP_2)

Movement of the null temporal operator also creates a path. Since the temporal operator is adjoined to VP, it is not dominated by by all segments of VP and thus the maximal projection dominating its trace will be the IP[6]. This is shown schematically in (20).

(20) $[_{PP}$ Op$_i$ $[_{IP}$ $[_{VP}$ $[_{VP}$ $]$ t_i $]$ $]$ $]$ (path from PP to IP)

Under this analysis, we can see that the data in (17) can be explained: In (17a), the long distance movement of the operator is unavailable because its path would overlap the path of the quantifier, as in (21). The short distance reading is available as in (22) since the paths contain each other.

(21) $[_{IP0}$ Every man t_i [left] $[_{PP}$ Op$_j$ after $[_{IP1}$ he$_i$ said [$[_{IP2}$ Bill $[_{VP}$ $[_{VP}$ left] t_j]]]]]]

Path 1 { IP_1, PP, IP_0 }
Path 2 { IP_2, IP_1, PP } (=17a)

---

[6] As discussed in May (1985:56ff). See also Chomsky 1986.

(22) [$_{IP0}$ Every man t_i [left] [$_{PP}$ Op_j after [$_{IP1}$ he_i [$_{VP}$ [$_{VP}$ said [$_{IP2}$ Bill [left]] t_j]]]]]

Path 1 { IP_1, PP, IP_0 }
Path 2 { IP_1, PP } (short distance reading)

(23) [$_{IP0}$ Every man t_i [left] [$_{PP}$ Op_j after [$_{IP1}$ he_i said [[$_{IP2}$ he_i [$_{VP}$ [$_{VP}$ left] t_j]]]]]]

Path 1 { IP_2, IP_1, PP, IP_0 }
Path 2 { IP_2, IP_1, PP } (=17b)

The data in (17) show that there are interactions between the null temporal operators and quantifiers. Another case in which the ambiguity is missing is that of modals. The long distance reading is blocked if there is a modal in the adjunct clause as in (24):

(24) *John left before Mary could say that Bill [left t]

On the assumption that modals are operators at LF, we can reduce this case to an operator interaction effect as well, if the modal creates a path ending in the PP (plausibly by assuming that the modal incorporates at LF into P, yielding a path at PP by percolation. This will again entail that the two operators must share the same path, and the long distance reading will become unavailable.

Further evidence for this point of view is the fact that the same fact applies for overt movement of *when* over a modal as in (25)[7]:

(25) *When might John say that Bill [left t]

A final lack of ambiguity is one of gerunds, noted by Johnson 1988. If the clausal PP selects a gerund, there is no long distance ambiguity.

(26) John left after saying that Bill left.

---

[7] The fact that (i) is grammatical shows that the interaction effect is restricted to adjunct extraction. This implies that all of the ECP effects attributed by Pesetsky to the PCC may not be correctly analysed.

(i) Who might John say that Bill likes

An obvious way to reconcile this fact is to use the PCC as one part of a conjunctive ECP in the way that Aoun et al. 1987 uses Generalized Binding . For our purposes the PCC is a useful expository device; whatever accounts for the types of crossing effects described by Pesetsky should also account for the present facts.

Here, there is no way to interpret the temporal operator relating to the downstairs clause.

Under the P IP analysis, there is no distinction between the structure of the gerund and the structure of the tensed clause.[8] This means that if the null operator can move to the Spec PP position in the tensed clause it should also be able to in the gerund.

Given the analysis of (17) it is possible that the ungrammaticality of (26) follows from the fact that there is control between the main clause and the adjunct clause. Given that control does not seem to involve quantification, it is not entirely clear why there should be any interaction effects at all. Suppose, however, that the Spec IP position is an A-bar position on the assumption that the subject NP has moved from inside VP (as proposed by Koopman and Sportiche 1985, 1990; Kitagawa 1986 for example). If paths are created by any A-bar movement, not just an operator movement, then the movement from VP to subject will create a path which is extended into the adjunct by the control relation. This will rule out the long distance reading in (26) exactly as (17a) was ruled out.

Notice that control into adjunct gerunds is obligatory, only the subject is a possible controller. The same facts appear to show up in cases of obligatory control involving infinitives, where long distance extraction of *when* is ruled out as in (27).

(27) *When did John try PRO to say that Bill [left t]

On the assumption that it is the subject which, in an A-bar position creates a path, then this would predict that there should be a contrast between subject control and object control in (27). This seems to be the case as in (28) where it is impossible to get the long distance reading for *when* in (28b) but possible in (28a).

(28) a. When did Bill persuade Fred PRO to claim that Mary [left t]
b. *When did Bill promise Fred PRO to claim that Mary [left t]

---

[8] Under a P CP analysis of the clausal adjunct, such as Larson's, it is plausible that the gerund, being an IP, would not exhibit the ambiguity, there being no landing site for the null operator. This explanation would not account for the previous two missing ambiguities, however.

Conclusion

There are two main results in this paper. The first is that a null operator analysis of temporal ambiguity need not rely on multiple selection as Larson 1990 claims, and certain properties attributed to multiple selection are more properly accounted for by the semantics of the temporal operator. The second result is that there are interactions between the null operator and other types of A-bar chains. I have sketched an account of these interactions using Path Theory and have argued that both modals and subject control give rise to A-bar paths.

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ESCOL '91 277-288

TONE AND STRESS IN THE SAN MATEO DIALECT OF HUAVE*

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That utterances have a metrical organization is accepted nearly universally; the relationship of such metrical organization to tonal phenomena is less clear. In some cases, where stress has a tonal associate or reflex, the mapping between the two is relatively trivial. For example, Halle & Vergnaud (1987) observe that the accented mora of a word in Creek is also the high (H) toned syllable. Similarly, Inkelas & Zec (1988) observe that the stressed mora in Serbo-Croatian is the the first syllable linked to a H in derived representation. In other cases, the relationship is highly complex. Sietsema (1989), for example, argues that abstract metrical structures in some Bantu languages condition domains for spreading or attraction (as in Goldsmith 1987), as well as interpretations of metrical prominences as tones. His analyses are posited even though stress, the typical reflex of metrical prominence, is of minimal significance in the languages being discussed.

I will show in this paper that in Huave, a language isolate of Mexico, tone and stress are both independent and observable vehicles of phonetic prominence, but the distribution of both can be calculated with the same metrical grid. The phrasal constituents of this grid are constructed from syntactic structure in the manner of Selkirk (1984) or Halle & Vergnaud (1987). Tones are shown to derive from three sources. Some stems in Huave have underlying low (L) tone which is phonetically realized only in a particular metrical environment (the right boundary of a phrasal foot). The distribution of H-tones, on the other hand, is fully determined by metrical constituency. Word-level stresses (evidenced by vowel gemination and obstruent voicing) are only loosely correlated with H-tones. H in fact marks the location of metrical prominence at the phrasal level. Finally, L is the default tone, assigned to all tone-bearing units which fail to receive tone lexically or metrically. L therefore is both the underlyingly marked tone and the default tone at once.

When a Huave word is spoken in isolation, the word-domain is also the phrase-domain and H tone always correaltes with primary stress. This gives rise to the illusion that Huave words have simple pitch accents (such as high/acute or falling/circumflex) like those of Japanese or Serbo-Croatian. In fact, falling tones derive from lexical L combined with H as a reflex of phrasal metrical footing. Huave provides direct evidence that both underlying tones and metrical structure are necessary and interactive components of the grammar of phonological prominence. In this way, Huave resembles Tibetan, in which, according to Meredith (1990), rules of tone licensing and contour simplification are conditioned by metrical structure. A non-metrical theory of tone, on the other hand, such as proposed by Pulleyblank (1986), is unexplanatory for Huave, since it cannot easily express the surprising and non-trivial interrelationship between tone and stress.

The data in this paper come from four sources: Pike & Warkentin (1961, henceforth PW), the primary source, where the alternations in tone and vowel length are described; Suaréz (1975, henceforth Su), a comparative study of Huave dialects and reconstruction of proto-Huave; and the Stairs & Hollenbach (1981) and Kreger & Stairs (1981) grammar and lexicon of the San Mateo dialect.

1. Surface Tone and Stress

PW observe that all vowels in Huave bear tone (on the surface), either H or L. For each word, however, there may exist up to four tonal allomorphs, depending on the syntactic environment:

(1) a. tók, tòk 'fig tree'

b. kʌ́ʌ̀t, kʌ́t, kʌ̀t 'fish'

d. gáyè, gàyè, gáyé 'rooster'

e. àndììg, ándììg, àndíìg, ándíìg 'beads'

f. bèhúgò, béhúgò, bèhúgò, béhúgó 'vine'

I will show that these alternations and their environments of occurrence are easily described in terms of a metrical grid. This same grid determines the location of word-stress, which we will begin with.

Primary word stress occurs on a final closed syllable:

(2) a. o ˈlam 'sugar cane' d. nipi ˈlan 'people'

b. na ˈkanc 'red' e. akooče ˈran 'it is cut'

c. taha ˈwʌw 'they saw'

Final open syllables, which occur in a small set of functional words and Spanish borrowings, never bear stress. Stress in such cases falls on the penult.

(3) a. ˈšike 'I'

b. ˈgaye 'rooster' < Sp. gallo

c. be ˈhugo 'vine' < Sp. bejuco

Secondary stress occurs on a final syllable of a stem to which inflectional suffixes totalling two or more syllables have been added. In (4), the inflectional suffix -ʌw is only one syllable, so the stem loses its stress; in (5), the suffixes -aran-aac total three syllables and the stem retains its stress:

(4) a. t-a ˈhaw 'he saw'
past - see

b. t-aha ˈw-ʌw 'they saw'
past - see - 3.pl

(5) a. a kiiəb 'he accompanies'

b. a ˌkiiəb-aran- ˈaac 'we are accompanied'
accompany - pass - 1.pl

Employing the formalism of Halle & Vergnaud (1987), stress can be correctly placed using the following algorithm. First, all and only syllabic heads are stress-bearing units. Second, the last segment of a word cannot figure in computations of stress. For closed syllables, there will be no effect, since a final C will be irrelevant, given that only syllabic heads are stress-bearing units. In the case of open syllables, stress may never fall upon these, since they cannot project onto the Stress Plane on which is constructed the metrical grid.[1]

On line 0 of this grid, construct unbounded right-headed constituents; promote the head of this constituent to line 1. This reveals the location of stress:

```
(6) a.  1    *                          b. 1         *
        0   (*] <.>                        0    (*       *]

            'ši  ke     'I'                      na  'kanc      'red'
            'ga  ye     'rooster'                 o  'lam       'sugar cane'

    c.  1           *                   d. 1         *
        0   (*  *   *]                     0    (*       *] <.>
            ni pi 'lan   'people'               be  'hu   go    'vine'
```

(6a,d) exemplify final open syllables which are marked extrametrical by rule (notated by the symbols <.>), yielding penultimate stress. (6b,c), with final stress, lack extrametricality.

To derive secondary stresses, I propose that there are two cycles of metrical construction, the stem cycle and the word cycle. Inflectional affixes are post-cyclic, this means that when they are added, previously built structure is automatically respected (Halle 1990). For example, (5b) will have the form (7a) at the output of stem cycle; before word-level stress-assignment, it appears as in (7b):

```
(7)  a.               b.                          c. 2                  *

     1     *          1     *                        1   (*              *]
     0 (*     *]      0 (*    *]    *   *   *        0 (*   *]   (*  *    *]
        akiiəb           akiiəb  aranaac                akiiəb  aranaac
```

To arrive at the desired representation in (7c), the same rules apply to (7b) as at the root-level, constructing an unbounded right-headed constituent over the suffixal material /-aranaːc/ on line 0 and providing the head of this constituent with a line 1 mark. In addition, a right-headed constituent is constructed on line 1, and the head of this foot is provided with a line 2 mark. The interpretation of the grid in (7c) is that the stress-bearing unit with a line 2 mark receives primary stress, and the unit with a line 1 mark but no line 2 mark receives secondary stress.

The above algorithm straightforwardly provides secondary stress to the final syllable of the root, and primary stress to the final closed syllable. It incorrectly predicts, however, that (4b) should have secondary stress on the final syllable of the root as in (8a), instead of none, as in (8b):

```
(8)   a.   *ta ˌha 'wʌw            c.   2              *
      b.   taha 'wʌw                    1        (*    *]
                                        0    (*   *] (*]
                                          t-ahaw- 'ʌw
```

To account for the failure of secondary stress in these cases, I propose that the first of adjacent stressed syllables becomes destressed by a familiar rule resolving stress clashes:

(9) Stress Clash Resolution
Delete a line 1 asterisk if immediately left-adjacent to another line 1 asterisk.

As a result of (9), the first asterisk of line 1 in (8c) is deleted and (8a) will surface as (8b) without secondary stress.

In sum, the stress assignment rules of Huave are relatively uncomplicated. Their true interest lies in how stress-assignment interacts with tone.

2. The Surface Independence of Tone and Stress

Although the location of stress is predictable by the scheme given in section 1, tone is lexically contrastive, the number of truly minimal pairs being rather small (Suaréz (1975); ɕ = č, underlying tonal forms given):

(10)	a. ɕil	a kind of fresh water fish, Sp. 'mojarra negra de agua dulce'
	b. ɕìl	'weaving needle'
(11)	a. cák	a kind of tree, Sp. 'guanacaste'
	b. cak	'thigh'
(12)	a. nʌ́t	'day'
	b. nʌt	'number'
(13)	a. ƙos	'knee'
	b. kos	'why'
(14)	a. nɕey	'grandmother'
	b. nɕey	a small kind of lizard, Sp. 'lagarto escamoso costeño'

Two observations lead to a clearer picture of the relation of tone to stress. First, as Suaréz (1975: 24 ff) first noted, tonal *contrasts* are observed only on stressed syllables. In other words, any underlying distinction in tone is observable only on a stress-bearing syllable: all other syllables receive tone from their environment. From the data in PW, it is clear that for words uttered in isolation pretonic syllables are low and tonic syllables are either H (15a,b) or HL (15c,d), whereas extrametrical (final open syllables) are always low (16):

(15)	a. o ˈlam	'sugar cane'	c.	iɕ ˈwɛak	'monkey'
	b. taha ˈwʌw	'they saw'	d.	a ˈʃoood	'he rests'
(16)	a. ˈga<ye>	'rooster'	b.	be ˈhu<go>	'vine'

The simplest account of the correlation observed so far is that lexical items are underlyingly marked L or nothing; the underlying Ls surface as HL when stressed and the underlyingly unmarked forms are simply H when stressed. A later rule, call it Default L, supplies L tone to any toneless vowel. The relation of tone to stress then is relatively trivial as in Serbo-Croatian.

The tonal behavior of phrasal utterances reveals that this cannot be the full answer, although historically Huave may have been a simple pitch-accent language.

The second key observation is that although H is correlated with stress in isolation forms, in phrases, H spreads rightward from a stressed syllable (within a certain domain to be made precise later), irrespective of the stress or tone of words in that domain. For example, compare the isolation forms in (17) with their concatenated form (18):

(17) a. tàhà ˈwʌ́w 'they saw' c. ò ˈlám 'sugar cane'
b. nà ˈkánc 'red'

(18) tàhà ˈwʌ́w ná̲ ˈkánc ó̲ ˈlám 'they saw red sugar cane'

In the isolation forms, the stressed syllable is also the syllable bearing H. When a verb takes an NP complement, the resulting VP forms a domain for the rightward spread of H associated with the stressed syllable of the phrasal head (the verb), irrespective of stress in the following words. Because H may spread onto stressless syllables (underlined), stressless syllables are not always L.

Inversely, stressed syllables are not always always H-toned, as the following example demonstrates.

(19) a. nà ˈdám 'large' b. ˈpɛ́àt 'mountain'

(20) nà ˈdà̲m̲ ˈpɛ́àt 'large mountain'

Although the underlined stressed syllable receives H in the isolation form (19a), when in "context," it may fail to show H as in the phrase (20), which could occur as a sentential subject. Hence word-level stress is not necessarily correlated with H.

Furthermore, if falling (HL) tone in isolation is taken as evidence for underlying L, then this L is completely obliterated by the spread of H through a particular phrasal domain:

(21) a. apee̲e̲d 'he picks'
b. apee̲d ɕipin 'he picks tomatoes'[2]

For example, although the verb in (21a) has falling tone in isolation from lexical L, it has no such L when in phrasal context (21b). The distinction between lexically L (isolation falling accent) forms and unmarked (isolation acute accent) is neutralized except at the edge of the domain for H-spread, where the contrasts still surface:

(22) a. ʃiʌ̲l̲ 'wood'
b. andoəg ʃiʌl 'he cuts wood'

(23) a. iɕwɛa̲k 'monkey'
b. tawaiiɕ iɕwɛa̲k 'he lied to the monkey'

At the phrasal level, then, lexical L characterizes those items which show L tone at the right boundary of the domain for H-spreading. In the next section I will formalize this domain and the general observations so far. To summarize, stress and tone are related in Huave, but not trivially as in Serbo-Croatian. The fact that underlying tone is contrastive only for syllables bearing word-stress suggests that there is some connection between stress and tone; however H and L are not uniformly associated with stress or stresslessness in surface representation.

3. The Domain of H-Spread and Phrasal Metrical Constituency

Although word-level stress and H are not correlated in surface representation, it remains true that the leftmost H in a domain of H-spread is always a stressed syllable. This leads naturally to the hypothesis that this syllable is the head of a phrasal metrical constituent and that H is inserted on this head. Consider the forms of these NPs when standing in isolation or as sentential subjects:

(**24**) a. nàdàm ˈpɛ́àt 'large mountain' [$_{NP}$ A N]
b. nàhmbòk à ˈɕiɕ 'bad sour-thing' [$_{NP}$ A N]
c. òmàl ˈìʌm 'top house = roof' [$_{NP}$ N N]
d. mìtɛ̀at mìntàh ˈnéèh '3-father 3-mother him = his father's mother'
e. nàngòʃ nʌ̀t tɛ̀at ˈnínè 'big day father child = 'Christmas' [$_{NP}$... N]

Here H begins at the stressed syllable of the last word in the constituent. This word has the same form as in the isolation form. This is to be expected if H is associated with the stressed syllable of the head of a domain, since for words in isolation, the domain is of necessity the word itself. For NPs, it is clear that syntactically the head is the rightmost N, since Huave NPs are uniformly right-headed.

We can use this syntactic constituency as the basis for a prosodic constituency, following a long tradition in the study of phrasal stress (for recent examples, Selkirk 1984, Halle & Vergnaud 1987). The lowest line in this grid (line 2) will represent those syllable heads which bear stress by the computation described in section 1.[3] Phrases (24a,b) then receive the following grid:

```
(25)  3                          *
      2          (*              *|
      1          (*|            (*|
      0    (*     *|     (*      *|
          na    dam #   --     ˈpɛat           'large mountain'
         nahm   bok #    a      ɕiɕ            'bad sour-thing'
```

Line 2 constituency is determined by the NP domain, and this foot is, like the feet on lines 0 and 1, right-headed. The same metrical grid places both primary and secondary word stresses (lines 1 and 2) and the location of H (the line 3 mark). In the next section we consider precisely how H is inserted and the rule for its spread.

Now consider what happens when an NP is embedded within a VP. As expected, the V head of the phrase receives H and this H spreads rightward through the entire domain, not merely to a following N, but also through intervening As (26a,b), Ps (26c), and non-phrase-final Ns (26d):

(**26**) a. sahaw raan olam
1-see white sugar-cane 'I see white sugar cane'

b. ahiʌr nambɛor gaye
has black rooster 'he has a black rooster'

c. sahaw tiʌl tok
1-see into fig-tree 'I see into the fig tree'

d. iwʌn oʃiŋ ʃamaɕat
2-sharpen nose (tip) 1-machete 'You sharpen my machete'

Observe again that, as in (21), lexical L is deleted in the intermediate constituents of (26a-c), which are given in isolation in (27):

(27) a. ráàan 'white' b. nàmbɛ̀or 'black' c. tíʌ̀l 'into'

VP as well as NP constitutes a domain for H-Spread, and lexical L, if any, appears only at the left edge of this domain. If VPs are left-headed (as they are syntactically) rather than right-headed, as are NPs and word-level feet, we get the right results:

```
(28) a. 4          *
        3          [*                 *)
        2          *       (*         *]
        1          (*]     (*]        (*]
        0      (*  *]      (*]   (*   *]
               sàháw   ráán   ólám                    (=26a)
               [VP I-saw [NP white sugar-cane]]

     b. 4          *
        3          [*                 *)
        2          *           (*     *]
        1          (*]         (*]    (*]
        0      (*  *]    (*    *]    (*] <.>
               ahiʌr    námbɛor   gaye                (=26b)
               [VP has  [NP black  rooster ]]
```

I now provide the formal rules to construct such grids.

(29) 1. Stem-cycle
a. Final segments cannot project onto the stress plane.
b. All and only syllable heads are stress bearing units.
c. Project stress-bearing units onto line 0 (respecting condition a)
d. Line 0 parameters are unbounded, right-headed.
e. Construct feet on line 0. Promote heads of line 0 to line 1.

2. Word-level (post-cyclic)
a. Repeat 1a-e, respecting previously built structure.
b. Line 1 parameters are unbounded, right-headed
c. Construct feet on line 1. Promote heads of line 1 to line 2.
d. Stress Clash Resolution (9).
e. Heads of line 1 feet are primary word stresses;
heads of (only) line 0 feet are secondary stresses.

3. Phrase level. Inner cycle. NP Domain
a. Line 2 parameters are unbounded, right-headed.
b. Construct feet on line 2 and promote heads to line 3.

4. Phrase level. Outer cycle (incorporates next larger domain, e.g. VP)
a. Line 3 parameters are unbounded, left-headed.
b. Equalize Stress[4]
c. Construct line 3 feet. Promote heads of line 3 to line 4.

The above formal account allows a simple definition of the domain of H-Spread: H spreads rightward within the domain of the line 3 constituent. I am assuming that in the case of NPs in isolation or as sentential subjects, the outer phrase cycle applies to these, yielding a line 3 foot as well, so that, for example, (25) appears as (30), suppressing the lower lines:

(30) 4 *
3 [*)
2 (* *]
nàdàm pɛ̀àt 'large mountain'
nàhmbòk àɕíɕ 'bad sour-thing'

We therefore explain naturally why final extrametrical syllables as in (28b) are extratonal: they lie outside of the line 3 foot. Furthermore, the conditions under which a lexical L may surface are also simple: lexical L is licensed only at the right-boundary of a line 3 foot, elsewhere it is deleted. Finally, the locus of H-Insertion is simply the head of the line 3 foot, i.e. the segment bearing the line 4 mark (modulo certain complexities of syllable nuclei which I discuss in the next section).

Returning to the allomorphs observed by PW in (1), these may now be correlated with metrical environments. Every word always has one allomorph which has all L tones which occurs outside the line 3 domain (for example, a prenominal modifier as in (24)). Each word also has an all H-toned allomorph, occurring within a line 3 constituent. The relationship of the allomorphs of (1b,e,f) to metrical domains is shown in (31a-d); only verbs can occur in the environment in (31e) since only verbs begin line 3 feet without also ending them:

(31) a. ____ |) ____ all L: kʌ̀t, àndìig, bèhùgò
b. | ... ____ ...) all H: kʌ́t, ándíig, béhúgó
c. | ___) H or HL on tonic syllable: kʌ́ʌ̀t, àndiíìg, behúgò
d. | ... ____) pretonic H; H or L on tonic: kʌ̀t, ándìig, béhúgò
e. | ____ ...) pretonic L; tonic H: tàhàwʌ́w, apéèd

Only in environments (31c,d) is the lexical L vs. unmarked distinction retained, because adjacency to a right boundary licenses the lexical L. Henceforth, I will cite a form with the letter (a-e) of example (31) which indexes its site of occurrence.

To summarize, both the locus of H and its domain of spread are reflexes of higher-level phrasal footing. It is extremely unclear how a non-metrical theory of tone (such as that given for Serbo-Croatian by Inkelas & Zec 1988) could account for the surface distribution of H and L in (31) without reference to such constituency. In the next section I discuss the reflexes of tone on vowel length.

4. Vowel Length as a Reflex of Tone

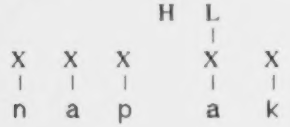
On the surface, PW record a three-way distinction in vowel length. For example, the vowel /a/ may appear short (32a), long (32b), or overlong (32c):

(32) a. nàpàk [a] , nápák [b] 'alive'
b. napáàk [c], ráàn [b], ràan [a] 'alive; white'
c. ráaàn [c] 'white'

Lexically toneless short vowels never vary in length. Otherwise, any given item will vary only between short and long ('alive') or between long and overlong ('white'). The lengthened variants are always conditioned by falling tone; varying forms must always have a lexical L. Because long vowels invariably lengthen in the falling environment, we conclude that these always have lexical L, an anomaly which I return to later.

In the case of short vowels (napàk --> napáàk), I propose that a second X-slot is inserted to support a H tone inserted as a reflex of line 3 headship:

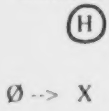
(33)



Assume that the second /a/ in (33) is linked to the head of a line 3 constituent, for example if the adjective is uttered in isolation. We expect that H should be inserted onto the /a/. If the X-slot is already L underlyingly, then H cannot link to it. Such a prohibition derives from a constraint on contour tones, which I take to be a language-specific parameter (although cf. Duanmu 1990).

In such a case as (33), H floats to the left of the preexistent L, presumably because it is conditioned by a left-boundary [. A rule of Unlinked H-Support inserts an X-slot to carry the H:

(34) Unlinked H-Support



The long vowel then derives from a simple spreading rule. However, where an on-glide /ɛ/ precedes the syllable head, it supports the floating H and so (34) does not apply:

(35) a. pɛac [c] 'tortilla' b. pɛat [c] 'mountain'

In order to derive the overlong vowels in a similar fashion, I propose that underlying L is linked to the left X of a geminate vowel. Hence, H-Support must still insert an X (36a), unless there exists an on-glide (36b) to support the H:[5]

(36) a. tiiid [c] 'tick'; apeeed [c] 'he picks'
b. akɛaaɕ [c] 'he teaches'; omɛaac [c] 'heart'

The fact that the left X of a geminate vowel must bear the underlying L follows because long vowels in fact derive from underlying /Vɦ/ sequences, where /ɦ/ represents an X-slot specified only for the laryngeal feature [+spread glottis]. Four considerations lead to postulating /Vɦ/ as the underlying form.

First, /VV/ and /Vɦ/ alternate in the same stems: geminate vowels appear only when the syllable head bears word-level stress (primary or secondary):

(37) a. à ˈpéèèd [c] 'he cuts' b. àpèh ˈtìʌw [c] 'they cut'

In (37b) the suffixation of the monosyllabic morph -ìʌw conditions the shift of primary stress to the final syllable. The penult appears with the underlying sequence /Vh/ and a following obstruent appears in its underlying unvoiced state. Because stress conditions vowel gemination, the stressless /Vh/ forms must be underlying.

Second, in environments which are always stressless, /Vh/ always occurs and /VV/ never does. Such an environment is the penultimate syllable when the final syllable is closed:

(38) *-VVCV(V)C#

In such an environment the sequence /Vh/ is abundantly represented:

(39) ahpoət 'it flowers'; wahtat 'sawfish'; ɕehtiʌn 'untied'; tehpɛay 'washtub'; ʃehken 'dull'; ihcʌw 'two (long, thin objects)'; wihɕiʌm 'it disperses'; pohniʌn 'darkness'; nenʌhpɛay 'salesman'

On the other hand, words with final extrametrical syllables may show long, stressed penults:

(40) a. ikoo<ca> 'we (incl. pl. nom.)'; hoo <wa> 'hello!'

A third reason for postulating underlying /Vh/ comes from historical and comparative evidence. Where the San Mateo and Santa María dialects have long vowels, the San Francisco and San Dionisio dialects preserve the underlying /Vh/ in all environments (Su: 8-9). Furthermore, in highly emphatic speech in one informant, Suaréz (p. 24) observed long vowels pronounced as /VhV/, with the geminate interrupted by aspiration. This again suggests that [+spread] is underlyingly present and is deleted under stress in all but the most careful speech.

Finally, the distribution of word-final sequences can be explained on the assumption that vowel gemination fails to apply in word-final position. The various sequences are given in (41):

(41)

permitted		unattested	
-Vh#	-V#	*-VV#	*-VVh#
-VVC#	-VC#	*-VhC#	*-VCh#

Assuming that long vowels are always derived allows the unattested forms each to receive a natural explanation. The final long vowels -VV# must derive from -Vh#, but if vowel gemination cannot apply word-finally, then -VV# will have no source. The second unattested form, -VhC#, automatically becomes -VVC, since as a closed syllable, it must bear stress and therefore undergoes gemination. *-VVh is barred because it must derive from -Vhh#, and Huave permits no geminates in underlying representation. Finally, *-VCh violates sonority sequencing, since /h/ is more sonorous than any preceding C.

From this I conclude that long vowels are underlyingly /Vh/ sequences; at the level at which lexical L links to a form, only the first half of a surface long vowel will be a legitimate tone-bearing unit. Such forms when in environment [c] will retain L, undergo vowel gemination due to stress, and receive an unsupported H, resulting in an overlong vowel with falling tone. Overlong vowels in all cases derive from long vowels with low tone in this fashion and always surface with falling tone. Hence, the three-way distinction in length reduces to a two-way distinction in length and tone. This is a happy result, insofar as an underlying three-way distinction in length is rarely if ever encountered in natural language.

Nevertheless this result comes at a certain cost, namely that underlying /Vh/ sequences are invariably L-toned lexically, such that in no case does a form /v́v́/ appear in environment [c]. This rather inelegant gap in the underlying system can be explained in the following way. Because Huave permits no geminates in underlying representation, it follows that syllable nuclei will always consist underlyingly of one [-cons] segment. Assume as well that this segment may bear the laryngeal features [+slack] = L, [+spread glottis], both of these, or neither:

(42)				
			[+spread]	[+spread]
			|	|
	a. [-cons]	b. [-cons]	c.[-cons]	d. [-cons]
		|		|
		[+slack]		[+slack]
	v	v̀	*v̤	v̤̀ --> v̀h
	tok (1a)	kʌ̀t (1b)	--	apehtiʌw (37b)

(42a) represents the lexically toneless short nucleus; (42b) the lexically L short nucleus. (42c) is an impossible underlying representation, since a voiceless vowel in Huave will presumably lack the sonority to project a syllabic nucleus. To derive the anomalous form [v̀h], I propose that (42d) undergoes the Breaking rule below:

(43)	Breaking:				
		[+spread]			[+spread]
		|			|
		[-cons]	-->	[-cons]	[-cons]
		|		|	
		[+slack]		[+slack]	

Breaking (43) is motivated because of a general constraint that each X-slot in Huave may bear at most one laryngeal feature: this constraint already motivated a rule of Unlinked H-Support (34). Another way to put this is that underlying "murmured" vowels (42d), like monomoraic falling tones, are not well-formed on the surface and are implemented as [v̀h]. A long syllable nucleus without any underlying laryngeal specifications, i.e. [VV], does not in some sense *need* two timing slots to bear laryngeal features: hence it never appears in Huave.

To summarize, the length of a syllable nucleus in Huave reflects the number of laryngeal features it bears; specifically, overlong vowels, which always have falling HL tones, can be seen as bearing three separate specifications, H, L, and, underlyingly, [+spread glottis].

5. Conclusion

The above analysis accounts for the large majority of the alternations first described by Pike & Warkentin.[6] To summarize: Tone and stress are independent vehicles of phonetic prominence in Huave, but are interrelated through the same metrical grid (29). This grid supplies (a) the location of primary and secondary stresses at the word level, (b) the locus of H-Insertion, (c) the domain of H-Spread and (d) the licensing environment for lexical L. An array of alternations in tone and vowel length are now easily correlated with metrical environments and lexical tone. Vowel lengthening, in particular overlong vowels with falling tone, can be derived on the assumption that an inserted H with no docking site conditions a rule of X-slot insertion (34). A three-way distinction in vowel length reduces to a two-way lexical contrast in tone and length. More generally, the length of a syllable nucleus is a reflex of how many laryngeal features that nucleus bears, on the assumption that Huave permits only one laryngeal feature per X-slot. Only L tone is underlyingly marked; L-toned items appear as falling only phrase-foot-finally. Hence the underlying tonal distinction is quite recessive on the surface: what was once probably a highly salient system of word pitch-accent is being eroded by a more pervasive pattern of phrasal intonation. For this reason, the San Mateo dialect will probably soon join the other dialects of Huave in discarding lexical tone altogether. The subtle and complex intermediate stage which Pike & Warkentin described, however, provides compelling evidence for the interdependence of lexical tone and metrical constituency.

FOOTNOTES

[*] I have benefited from discussions with Morris Halle, Bill Idsardi and Michael Kenstowicz. This research was supported by a NSF Graduate Fellowship.

[1] Final long vowels occur rarely if ever in Huave. See section 4.

[2] The variation in vowel length seen in these forms will be explained later in section 4.

[3] I am assuming that words which have only the stem-cycle also undergo vacuously a second cycle which enhances the line 1 stress mark to line 2. Hence all primary word stresses appear on line 2 for the purposes of phrasal metrical computation.

[4] This step is required to provide a line 3 mark, for example, to the verb in (28b). This is accomplished in virtue of the Stress Equalization Convention (Halle & Vergnaud 1987:84).

[5] Observe that stress alone does not condition vowel-lengthening. A lexically toneless short nucleus, as in tok 'fig tree,' surfaces as tok when stressed in environment [c].

[6] A number of issues remain undiscussed, including the relation of tone to obstruent voicing and the positioning of falling contours over complex syllable nuclei. PW also describe various lexical and syntactic environments that are exceptions to the general patterns: these await further study.

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ESCOL '91 289-300

Dative Compounding and the Prominence Theory of Theta Assignment

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Generally, synthetic compounds involving datives can include the theme, but not the goal argument of the verb in the compound structure. In this paper, I present and discuss several exceptions to this generalization. I argue that although a prominence theory of theta assignment (Grimshaw & Mester 1988, Grimshaw 1990) correctly predicts the grammaticality of the standard compound constructions, it is not sufficient to account for the exceptional cases.

I propose that a complete explanation of the paradigm must involve a correlation with a dative verb's ability to appear in a double object construction. In particular, I suggest that Larson's (1990) argument/adjunct distinction with the second object of verbs traditionally considered dative be adopted, and that second objects of argument status be independently ruled out of compound constructions. I suggest that these arguments are excluded because their theta roles, being tied up in the bidirectional relationship of Inherent Case, cannot be assigned at the level of compounding.

Finally, I discuss additional synthetic compounds that on the surface seem to be exceptions to both the prominence theory and the account developed in this paper. I show that these exceptions are not counter-examples to the given theories if an analysis originally proposed in Roeper & Siegel (1978) is adopted.

Introduction:

Grimshaw (1990) defines synthetic compounds as compounds in which the non-head member of the compound satisfies an argument position in the argument structure of the compound head. Grimshaw assumes that the non-head is theta marked by the head. The examples in (1) illustrate synthetic compounds in which the non-head noun satisfies the theme thematic role of the verb included in the compound head.

(1) a. flower-arranging
b. cookie-baking
c. fish-eater

Grimshaw notes certain asymmetries in the compounding data. In (2), while the theme is acceptable in a dative compound, the goal is excluded.

(2) a. gift-giving to children
b. *child-giving of gifts

To account for these asymmetries, Grimshaw uses the prominence theory of theta assignment as developed in Grimshaw and Mester (1988). The prominence theory contends that theta marking respect the organization of argument structure, the least prominent element of a given argument structure being theta marked first and the most prominent last. Prominence is defined according to relative position on a thematic hierarchy (cf. Jackendoff 1972). Under the assumption that the theme theta role is less prominent or lower in the thematic hierarchy than the goal theta role, the prominence theory predicts that theme theta roles be assigned before goal theta roles. This analysis correctly rules out (2b) in which the goal role, internal to the compound, is assigned before the theme role.

Under the assumption that the prominence theory is sensitive to the argument structure of the deverbal head of a synthetic compound, and not simply the arguments overtly realized, Grimshaw's account might be extended to include the examples in (3) and (4). In each of these cases, a theme argument to a dative verb is acceptable in a compound construction while a goal argument is not.

(3) a. gift-giver
b. *child-giver

(4) a. story-teller
b. *child-teller

Apparent Counter Examples:

Grimshaw's prominence theory would seemingly rule out all dative compounding with a goal argument. The theme role, less prominent than the goal role, must be assigned before the goal role and this is only possible if the theme argument is internal to the compound. For the most part, this prediction obtains. (Hoeksema 1985) As the data in (5) demonstrate, however, there are cases in which the goal argument can be realized within the compound.

(5) a. campaign-contributor
b. library-donator
c. restaurant-distributor

For the prominence theory to correctly allow the examples in (5), the argument structures of "contribute," "donate" and "distribute" would have to include a theme role only optionally. In that case, the assignment of the goal theta role would not skip a less prominently marked role. Superficially, this would seem to be the case as a theme is not overtly required in the syntax.

(6) a. I contributed to the campaign.
b. I donate to charity.

On the other hand, to rule out the similar examples in (3) and (4), the theme arguments to "give" and "tell" would have to be obligatorily present in argument structure. As (7a) illustrate, the theme argument of "tell" is obligatory. "Give," however, patterns with "contribute" and does not require an overt theme.

(7) a. *I tell to children.
b. I give to charity.

Roeper & Siegel (1978) develop a transformational account of synthetic compounding which does suggest that the theme argument to "give" is obligatory. They argue that even when a direct object is not overtly realized with "give" it is implicitly presupposed. Consider first the examples in (8) and (9).

(8) a. danced an hour
b. danced for an hour

(9) a. *not going to hear an hour
b. not going to hear for an hour

Roeper and Siegel suggest that the direct object for a verb such as "dance" is truly optional. "Dance" does not necessarily expect an object and there is no confusion when a temporal NP adjunct is encountered immediately after the verb as in (8a). Verbs such as "hear," however, do expect a direct object. In (9a), the NP following the verb is not semantically appropriate as the direct object and the construction is ungrammatical. The situation is different in (8b) where the presence of a preposition telegraphs the NP's adjunct status. Thus, Roeper & Siegel claim, the lack of an overt direct object is not a guarantee that such an argument is truly optional.

Considering the verb "give," Roeper and Siegel note that the data pattern with "hear" in example (9). While a direct object need not be overtly realized as shown in (6b) & (10b), a preposition is necessary to mark the following NP as an indirect object. In (10c), the only possible interpretation is that with "charity" as the direct object.

(10) a. We gave money to charity.
b. We gave to charity.
c. *We gave charity.

Under the assumption that the argument structure for "give" obligatorily includes a theme argument, the prominence theory correctly rules out "child-giver." The assignment of the goal theta role internal to the compound would skip the assignment of the less prominent theme role. The prediction then is that verbs such as "donate," which do permit the goal argument in compound constructions, should only optionally select a theme and pattern syntactically with "dance." Unfortunately, this prediction is not borne out.

(11) a. We donated money to charity.
b. We donated to charity.
c. *We donated charity.

As the data in (11) illustrate, the "donate" class of verbs patterns with the "give" class in terms of Roeper and Siegel's analysis. If the examples in (10) are sufficient proof that the theme argument to "give" is obligatory, then (11) should be proof that the theme argument to "donate" is obligatory. If so, then the prominence theory cannot account for the compounding asymmetries between "give" and "donate" as the goal compounding with the "donate" class in (5) is incorrectly ruled out. Alternatively, if Roeper and Siegel's analysis is rejected and it is assumed that the theme argument to both "give" and "donate" is truly optional, then the prominence theory incorrectly predicts the goal compounding with "give" (3b) to be grammatical.

To summarize the problem, without a distinction between "give" and "donate" in terms of theme optionality, the prominence theory of theta assignment cannot account for the compounding differences between these verbs.

The Double Object Connection:

As the reader may have noted, there is an interesting correlation between the compounding asymmetries and the syntactic distributions of the verbs considered above. Verbs such as "give", that do not allow the goal argument in the compound structure (3), can appear in either double object (12a), or, standard dative (12b) form at S-structure.

(12) a. We gave the charity some money.
b. We gave some money to the charity.

On the other hand, verbs such as "donate," which do allow the goal argument in the compound structure (5), do not permit the double object construction.

(13) a. *We donated the charity some money.
b. We donated some money to the charity.

Larson (1990) suggests that the syntactic distributions of verbs traditionally considered dative is a result of whether the second object to a given verb is an argument or adjunct. Extending a suggestion by Jackendoff (1990) that beneficiary-for phrases are adjuncts, Larson proposes that the second object, or, goal phrase, to verbs such as "donate" is actually an adjunct. Larson maintains the traditional assumption for verbs such as "give" and holds that the goal phrase in these cases is an argument.

Under this analysis, "donate" would no longer be considered a true dative verb. "Donate" would not select for a goal argument and the argument structure for "donate" would include only a theme and an agent (14a). "Give," of course, would still select for both a goal and a theme (14b).

(14) a. donate : (agent theme)
b. give : (agent goal theme)

To support this claim, Larson notes that although the goal PP in a VP headed by "give" is implicitly presupposed, the goal PP in a VP headed by "donate" is not.

(15) a. John gave that money *(to Mary).
b. John donated that money (to charity).

Thus the compounding asymmetries between verbs such as "give" and "donate" might not be due to any difference in terms of the theme argument to these verbs, but, due to some difference involving the goal, namely, whether the goal is an argument or an adjunct. Before pursuing this idea, it is first necessary to examine the distribution of adjuncts in synthetic compounds.

Adjuncts in Compounds:

Selkirk (1982) notes a distinction in the compound possibilities of transitive and intransitive verbs. As the examples in (16) and (17) demonstrate, non-head nouns in a synthetic compound can be realized with an adjunct interpretation if the verbal base of the compound is intransitive, but, not if it is obligatorily transitive.

(16) a. John devours fish.
b. fish-devourer
c. *John (only) devours in restaurants.
d. *restaurant-devourer

(17) a. John eats fish.
b. fish-eater
c. John (only) eats in restaurants.
d. restaurant-eater

The grammaticality of the compounds above is correctly predicted by the prominence theory of theta assignment. Under the assumption that adjunct theta roles are more prominent than theme theta roles (the least prominent theta role in the thematic hierarchy), an adjunct theta role should not be able to be assigned until after any necessary theme role is assigned. (16c) suggests that "devour" is an obligatorily transitive verb and thus requires a theme argument. Assignment of any other theta role within a compound headed by "devourer," such as to a locative adjunct in (16d), violates the prominence theory of theta assignment. (17c), on the other hand, shows that the verb "eat" does have an intransitive usage and does not require a theme argument. The assignment of an adjunct theta role in a compound with "eat" as a verbal base (17d) therefore does not necessarily skip the assignment of a theme role and is correctly permitted by the prominence theory.

In this light, consider again the compounding possibilities of the verb "contribute," which, following Larson (1990), this paper now assumes to take the goal as an adjunct.

(18) a. I contributed money to the campaign.
b. money-contributor
c. I contributed to the campaign.
d. campaign-contributor

Obviously, "contribute" patterns with "eat" in allowing either a theme (18b) or adjunct (18d) as the non-head noun in a synthetic compound. Also similar to "eat," "contribute" does not obligatorily require a theme argument in syntax (18c). Assuming then that "contribute" only optionally selects for a theme, the assignment of the adjunct goal theta role in the compound does not violate the prominence theory.

Note that not all dative verbs reanalyzed as transitive verbs taking a goal adjunct permit compounding with the goal. One such case is the verb "introduce" which minimally differs from "contribute" in requiring a theme argument. In (19d), the assignment of the goal theta role internal to the compound skips the assignment of the less prominent theme role and, as predicted, results in ungrammaticality.

(19) a. I introduce the speakers to the audience
b. speaker-introducer
c. *I introduce to the audience
d. *audience-introducer

Ruling out "child-giver":

As the theory now stands, there is still no explanation for the compounding asymmetries between "give" and "donate." Verbs such as "donate," which do not appear in the double object construction and take the goal PP as an adjunct, allow the full range of compounding possibilities provided the assignment of theta roles does not violate the prominence theory of theta assignment. On the other hand, nothing suggested so far rules out compounding with the goal with verbs such as "give" which do take the double object construction and therefore take the goal PP as an argument. As suggested above, it is unlikely that "give" and "donate" can be distinguished in terms of the optionality of the theme. What would be useful then, is some means, independent of the prominence theory, for ruling out goal arguments in compound structures.

Pesetsky (1982) and Baker (1988) propose that goal argument phrases are Inherently Case marked in Russian and Icelandic respectively. Pesetsky's definition of Inherent Case is given in (20). Chomsky's (1986) defintion is given in (21).

(20) Inherent Case - Certain verbs will theta mark a constituent only if it bears a particular Case.

(21) Inherent Case - If A assigns inherent Case, then B receives a theta role from A if and only if B receives Case from A.

Pesetsky's definition has theta assignment contingent upon Case assignment. Chomsky's definition suggests a bidirectional relationship between Case and theta assignment. Crucially, in both definitions theta assignment cannot occur without the assignment of Case.

It is not unreasonable to suppose that synthetic compounds are formed in the lexicon prior to D-structure. It is also not unreasonable to assume that at this level of compounding there is no Case assignment, such being reserved until D-structure at the earliest. Therefore, any argument assigned Inherent Case should not be eligible to receive a theta role at the level of compounding. Clearly, if the goal arguments to true dative verbs were assigned Inherent Case in English as well as in Russian and Icelandic, such arguments would not be eligible for theta assignment in compound structures.

One immediate criticism of this approach is that in the double object construction, it is the theme and not the goal argument that is assigned Inherent Case. As noted, the theme is nonetheless possible in a compound structure.

(22) a. I gave the children books.
b. book-giver

There is an answer to this criticism, however, if additional proposals of Larson (1990) are accepted. Larson argues that double object constructions are underlyingly normal dative constructions at D-structure. The double object construction is formed via syntactic movement.

(23) a. I gave books to the children. (D-struct)
b. I gave the children books. (S-struct)

If D-structure is the immediate projection of information contained in the lexicon, then it is information about the dative (23a) that is contained in the lexicon. The lexical entry for "give" might then specify that the goal theta role is assigned to the argument Case marked by the dative Case assigner "to." That the theme argument might later appear in a position to which structural case assignment is impossible is an issue of syntax. Furthermore, if compound formation accesses the information contained in the lexicon directly, structural configurations arising via syntactic movement are irrelevant.

To summarize, D-structure and synthetic compounds are direct projections of information contained in the lexicon. Goal arguments are marked in the lexical entry of each dative verb as requiring a particular Case (perhaps for identification) for theta assignment. Case assignment is not available in compound formation and goal arguments to dative verbs can subsequently not receive a theta role in a compound structure. Syntactic movement processes may later alter the structure of a dative sentence, yielding the double object construction and superficially changing the particulars of Case assignment.

Note however, that since adjunct theta roles can be assigned in compound structures, such assignment must crucially not rely on Inherent Case assignment by a verb. This is intuitively appealing, however, under the assumption that only phrases which receive their theta role directly from a verb must be identified by that verb.

An Account of "dog-teacher":

Verbs such as "teach" and "serve" immediately surface as counter-examples to the theory outlined above. These verbs, although true datives appearing in the double object construction and thus taking their oblique phrases as arguments, do permit compounding with the oblique argument. "Teach" and "serve" differ from "give" in selecting a patient rather than goal phrase as the oblique argument. Still, the compound possibilities are not predicted if the patient phrase is assigned Inherent Case.

(24) a. John taught tricks to the dogs.
b. John taught the dogs tricks.
c. trick-teacher
d. dog-teacher

Roeper & Siegel (1978) account for verbs such as "teach" in terms of an analysis in Wasow (1977). Wasow noted that the oblique argument (patient) to these verbs evidenced several properties of a direct object (theme). For example, the oblique argument to a dative verb is normally not acceptable in an "-able" construction (25d), but, is so acceptable with the "teach" class of verbs (26d).

(25) a. I told John the story.
b. I told John.
c. The story isn't tellable.
d. *John isn't tellable.

(26) a. John teaches handicapped children manual skills.
b. John teaches handicapped children.
c. Manual skills are teachable.
d. Handicapped children are teachable.

Additionally, while direct objects are generally Case marked by the preposition "of" in NP constructions (27a), oblique arguments (27b) cannot be. However, with verbs such as "teach" the oblique argument again patterns with the direct object.

(27) a. My telling of the story
b. *My telling of John

(28) a. John's teaching of manual skills
b. John's teaching of handicapped children

It would seem then that there are two distinct readings for verbs such as "teach." In one reading, the verb takes both a theme and a patient argument. In the other reading, the canonical patient argument is realized as a theme. Corresponding to these two distinct readings are possibly two distinct lexical entries, each with its own argument structure.

(29) a. teach$_1$ (agent patient$_1$ theme$_1$)
b. teach$_2$ (agent theme$_2$)
:where theme$_2$ = patient$_1$

Under this analysis, the compounding possibilities of the "teach" class of verbs do not prove to be counterexamples to the prominence theory account. In "trick-teacher," a theme theta role, the least prominent role, is assigned within the compound structure. In "dog-teacher," it is again a theme role, although this time of a lexically distinct verb, assigned within the compound.

This analysis gains additional support in that it correctly rules out (30a), an example not handled by the prominence theory alone.

(30) a. *trick-teaching of dogs
b. trick-teaching to dogs
c. *dog-teaching of tricks

The prominence theory does rule out (30c), in which the patient theta role, although more prominent than the theme role, is assigned first. Moreover, (30b) with the opposite ordering of theta assignment is correctly allowed by the prominence theory. But, the prominence theory is similarly satisfied in (30a) and thus does not predict the example's ungrammaticality. If "trick" receives a theme role in (30a), however, "dogs" must receive the patient role. As noted, this role is incompatible with the preposition "of." On the other hand, if "teach" in (30a) is teach$_2$, and assigns a theme role to "dogs," there is no role to assign to "trick."

Summary & Conclusions:

The prominence theory of theta assignment (Grimshaw & Mester 1988, Grimshaw 1990) correctly accounts for a significant portion of the synthetic compound paradigm. In particular, the prominence theory offers an explanation for the particular thematic roles that the non-head member of an intransitive or transitive deverbal compound can and cannot receive, and, predicts the ordering of thematic arguments in a complex NP headed by a compound. The prominence theory, however, is not sufficient to account for certain asymmetries in the compound possibilities of dative verbs. To distinguish the "give" and "donate" classes of compounds, the prominence theory requires that the theme argument be obligatory for "give" and optional for "donate." Such a distinction was shown to be unlikely.

However, if Larson's (1990) argument/adjunct distinction with the goal phrases to these verbs is adopted, the compound asymmetries can be explained. Verbs such as "donate" reduce to the normal compound constructions with intransitive and transitive verbs, and, allow compounding with the goal adjunct if the theme is optional. Verbs such as "give," on the other hand, can never form a compound with a goal phrase as this phrase is an argument which receives its theta role via the bidirectional relationship of Inherent Case. This paper argues that Inherent Case is not assigned at the level of compounding.

To account for the compounding possibilties of the "teach" class of verbs, which contradict the predictions of both the prominence theory and the additional theory developed above, an analysis originally proposed in Roeper and Siegel (1978) must be adopted. Roeper and Siegel note certain tendencies of the oblique argument (patient) of "teach" to pattern as a direct object (theme). This paper interprets those tendencies as an indication that there are two distinct readings, and, possibly two distinct lexical entries for the verb "teach." When "teach" forms a compound with its patient argument, it is not via the lexical entry for the dative "teach," and the patient is not an argument assigned Inherent Case.

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ESCOL '91 301-312

CROSSING COREFERENCE: NO EVIDENCE FOR PRONOMINALIZATION

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In this paper, I demonstrate that the apparent weak crossover effects in Bach-Peters sentences with inversely bound pronouns (or 'crossing coreference') do not provide an argument for a syntactic rule of Pronominalization which derives surface pronouns from underlying full NPs. I develop an independently motivated account for these effects that allows us to treat pronouns as underived at all syntactic levels.

Pronominalization was originally conceived to explain the various restrictions on pronoun-antecedent relations (e.g. Lees & Klima (1963)). However, no pronouns without and not all pronouns with a sentence internal antecedent can be transformationally derived from underlying full NPs (cf. Postal (1966), Bach (1970)). Lasnik (1976) moreover showed that Pronominalization cannot capture the coreference restrictions typical for pronouns. For these and other reasons, current theory rejects Pronominalization and treats pronouns instead as underived elements whose coreference possibilities are restricted by the Binding Theory of Chomsky (1981).

Jacobson (1977) presents a syntactic argument[1] in favour of Pronominalization that seems compelling at first glance. With the notable exception of Higginbotham (1981), this argument has been largely overlooked by opponents of a transformational treatment of pronouns. Consider the following pair of Bach-Peters sentences with crossing coreference of inversely linked pronouns:

(1) a. [$_{NP}$ the woman [$_{CP}$ who$_i$ [$_{IP}$ t$_i$ loved him$_j$]]]$_i$ saw
[$_{NP}$ the man who wrote to her$_i$]$_j$
b. *[$_{NP}$ the woman [$_{CP}$ (who$_i$) [$_{IP}$ he$_j$ loved t$_i$]]]$_j$ saw
[$_{NP}$ the man who wrote to her$_i$]$_i$

On the surface, (1b) does not violate any principle that is obeyed in (1a) and the contrast in acceptability is left unexplained. Note in particular that in both sentences, the subject-embedded pronoun is bound by the (non-c-commanding) object, a violation of Reinhart's claim that "bound anaphora is possible if [and only if] a given NP c-commands a pronoun" (Reinhart (1983:166)).

Jacobson observes that once the subject embedded pronoun is replaced by the full object NP it is coreferent with, the ungrammaticality of (1b) reduces to a weak crossover violation. This is shown in (2b), where *her*$_i$ illicitly precedes the A'-bound variable t_i. No weak crossover violation results if we perform a similar operation on the grammatical (1a), as can be seen in (2a).

(2) a. $[_{NP}$ the woman $[_{CP}$ who$_i$ $[_{IP}$ t$_i$ loved $[_{NP}$ the man $[_{CP}$ who$_j$ $[_{IP}$ t$_j$ wrote to her$_i]]]_j]]]_i$ saw $[_{NP}$ the man who wrote to her$_i]_j$

b. *$[_{NP}$ the woman $[_{CP}$ (who$_i$) $[_{IP}$ $[_{NP}$ the man $[_{CP}$ who$_j$ $[_{IP}$ t$_j$ wrote to her$_i$ $]]]_j$ loved t$_i]]]_i$ saw $[_{NP}$ the man who wrote to her$_i]_j$

We are led to conclude that (1ab) are derived from the same underlying representations as (2ab) via a rule of Pronominalization which substitutes a pronoun for the full NP embedded in the matrix subject. Provided that the prohibition against weak crossover holds at d-structure, the ungrammaticality of (1b) is now straightforward since at this level, both (1b) and (2b) violate the relevant prohibition.[2]

Higginbotham (1981) offers a non-transformational Linking Theory account for the contrast in (1). Linking Theory represents the antecedence relation asymmetrically with the help of arrows and uses the dependency relation defined in (3) to capture various restrictions on coreference.

(3) X is *dependent* on Y if (i) Y is contained in an antecedent of X or (ii) for some Z, X is dependent on Z, and Z is dependent on Y. (Higginbotham (1981:404)

According to (3i), the pronouns *him*$_j$ and *he*$_j$ embedded in the matrix subjects of (1) are dependent on the object embedded pronoun *her*$_i$. The latter is in turn dependent on t_i, the variable left behind by relativization of the subject head.

By (3ii), *him*$_j$ and *he*$_j$ are thus dependent on t_i. Cutting some corners, we might summarize Higginbotham's explanation for the contrast in (1) by saying that this dependency relation is licensed in (1a), where the variable c-commands the pronoun that is dependent on it, but is prohibited in (1b), where the c-command relation is reversed.

The problem with this account is that independent principles of Higginbotham's theory predict both examples in (1) to be ungrammatical. Linking Theory holds that no element can be dependent on itself at LF. This condition is required to exclude circular coreference in (4).

(4)

*[his wife] saw [her husband]

In (4), *his* is dependent on *her* and vice versa (cf. (3i)). *His* is therefore also dependent on itself (cf. (3ii)), a state of affairs that rules out the antecedence relations indicated in (4). But it should be obvious that the same reasoning excludes both examples in (1): Each of the pronouns is contained in the antecedent of the other. This makes the pronouns dependent on each other (via (3i)) and thus themselves (via (3ii)). Since Linking Theory has to rule out self-dependency and hence crossing coreference in the grammatical (1a) and the ungrammatical (1b) alike, this theory fails to explain the contrast in (1). We seem to be stuck with the Pronominalization approach to the problem of apparent weak crossover effects in Bach-Peters sentences.

A Pronominalization-based explanation for the contrast in (1) in particular and coreference between pronouns and non-c-commanding NPs in general looses much of its appeal once we consider another type of data. The following examples and judgements are taken from May (1985) who compares Bach-Peters sentences with structures that resemble them in that the matrix subject contains a pronoun bound by the matrix object, but that differ from Bach-Peters sentences in that the matrix object lacks a pronoun bound by the matrix subject.

(5) a. [every pilot that shot at it$_i$]$_j$ hit [some MIG that chased him$_j$]$_i$ (May (1985:19))
b. [which pilot who shot at it$_i$]$_j$ hit [every MIG that chased him$_j$]$_i$ (May (1985:59))
(6) a. *[every MIG that chased him$_i$] hit [some pilot]$_i$ (May (1985:148))
b. *[some pilot who shot at it$_i$] hit [every MIG]$_i$ (May (1985:55))

According to May, binding of a pronoun within the quantified subject by the non-c-commanding quantified object is always possible in Bach-Peters sentences (cf. (5)). But such a bound variable interpretation is never available when the quantified object itself does not contain a pronoun bound by the quantified subject (cf. (6)).

Pronominalization has nothing to say about the contrast in (5,6) because it derives surface pronouns from underlying *definite* NPs only. As a result, it simply cannot be involved in any of these examples. Higginbotham & May (1981) observe that it is for example implausible to derive (5a) from the same underlying structure as (7), since the two sentences are not synonymous.

(7) [every pilot who shot at [the MIG that chased him$_i$]$_j$]$_i$
hit [some MIG that chased him$_i$]$_j$

(7) requires a context in which every pilot was chased by a unique MIG. No such requirement holds of (5a). The latter sentence is compatible with a context where every pilot was chased by a whole squadron of MIGs.

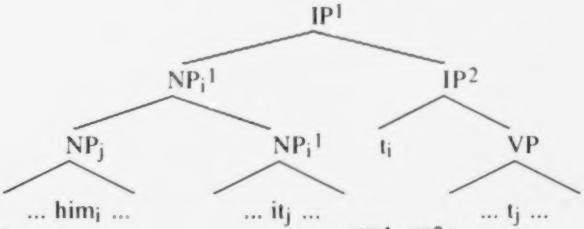
With Pronominalization unable to explain the grammaticality of (5) vs. the ungrammaticality of (6), a different solution for variable binding without c-command has to be found. Before I develop my own account and show how it explains the contrast in (1) as well, let me point out that May's solution to the problems arising in connection with (5,6) is inadequate. According to May, Reinhart's c-command condition on bound anaphora holds at the level of LF after QR has applied. May assumes that QR adjoins quantified subjects to IP. But whereas the quantified object is adjoined to the IP-adjoined subject in (5), it is adjoined directly to IP in (6). The LF representations of (5a,6a) are given in (8).

(8) a. [$_{IP}$ [$_{NPi}$ [$_{NPj}$ some MIG that chased him$_i$]$_j$ [$_{NPi}$ every pilot that shot at it$_j$]$_i$] [$_{IP}$ t$_i$ [$_{VP}$ hit t$_j$]]]
b. *[$_{IP}$ [$_{NP}$ some pilot]$_i$ [$_{IP}$ [$_{NP}$ every MIG that chased him$_i$]$_j$ [$_{IP}$ t$_j$ [$_{VP}$ chased t$_i$]]]]

May's explanation for the ungrammaticality of (6a/8b) is couched in path-theoretic terms (cf. Pesetsky (1982)). Path Theory holds that those branches of a syntactic tree which connect a variable and its A'-binder (i.e. a pronoun or trace in argument position and their antecedent in non-argument position) form a path. The Path Containment Condition states that intersecting paths must always embed and never overlap, where two paths intersect if and only if they share at least two structurally adjacent nodes.

The paths of (5a/8a) either embed each other or do not intersect at all, as illustrated in (9).

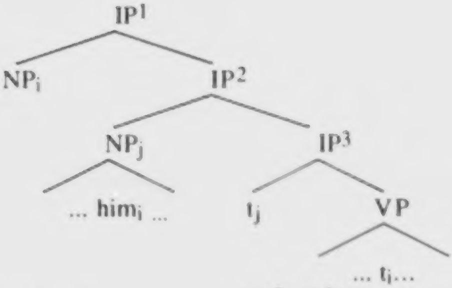
(9)



path (t_i) = {IP^1, IP^2}
path (t_j) = {NP$_i^1$, IP^1, IP^2, VP, ...}
path (him_i) = {NP$_j$, ...}
path (it_j) = {NP$_i^1$, NP$_i^2$, ...}

This is however not the case in (6a/8b), whose paths are shown in (10).

(10)



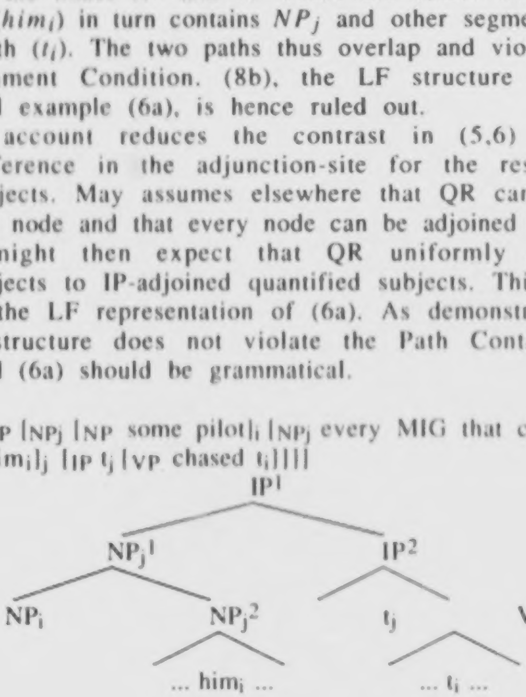
path (t_j) = $\{IP^2, IP^3\}$
path (t_i) = $\{IP^1, IP^2, IP^3, VP, \ldots\}$
path (him_i) = $\{IP^1, IP^2, NP_j \ldots\}$

Here path (t_i) and path (him_i) intersect because both contain the structurally adjacent nodes IP^1 and IP^2. Path (t_i) also contains the nodes IP^3 and VP which are absent from path (him_i). Path (him_i) in turn contains NP_j and other segments not present in path (t_i). The two paths thus overlap and violate the Path Containment Condition. (8b), the LF structure of the ungrammatical example (6a), is hence ruled out.

May's account reduces the contrast in (5,6) to an arbitrary difference in the adjunction-site for the respective quantified objects. May assumes elsewhere that QR can freely adjoin to any node and that every node can be adjoined to only once. We might then expect that QR uniformly adjoins quantified objects to IP-adjoined quantified subjects. This gives us (11a) as the LF representation of (6a). As demonstrated in (11b), this structure does not violate the Path Containment Condition and (6a) should be grammatical.

(11) a. $[_{IP}\ [_{NP_j}\ [_{NP}$ some pilot$]_i\ [_{NP_j}$ every MIG that chased him$_i]_j\ [_{IP}\ t_j\ [_{VP}$ chased $t_i]]]]$

b.



$$\begin{aligned}
\text{path } (t_j) &= \{IP^1, IP^2\} \\
\text{path } (t_i) &= \{NP_j{}^1, IP^1, IP^2, VP\} \\
\text{path } (him_i) &= \{NP_j{}^1, NP_j{}^2, \ldots\}
\end{aligned}$$

The problem for May is that he has no principled way of ruling out (11a). This problem is not restricted to his specific approach. It is shared by all theories that license bound pronouns at LF with the help of QR. Such theories will, if unrestricted, allow (6) along with (5). If sufficiently restricted to exclude (6), they will also exclude (5). Neither result is correct. The obvious and theoretically interesting conclusion is that LF-movement is not involved in pronoun binding.

My own account for the contrast in (5,6) (and ultimately that in (1) as well) does therefore not depend on LF movement. Instead, it is based on the way in which the matrix subject and object of Bach-Peters sentences refer. Keenan (1972:458) states that "... the logical (and psychological) difficulty in representing the truth conditions of [Bach-Peters sentences] is that one cannot refer to the referent of either of the [matrix arguments] without apparently having already established that of the other." In other words, neither of the quantified phrases and *wh*-phrases in (5) deserves a referential index that is independent of that of the other scope bearing element in the clause. Instead, their indices are dependent on each other. I propose to formally capture this in the following rule of Dependent Indices Assignment.

(12) Dependent Indices Assignment
Given two noun phrases NP^1 and NP^2, where NP^1 is referentially dependent on NP^2 and NP^2 is referentially dependent on NP^1, assign NP^1 the referential index $_{i(j)}$ and assign NP^2 the referential index $_{j(i)}$.

Two NPs are referentially dependent on each other if each contains a variable bound by the other. The indices that (12) assigns to NPs which meet this condition are reminiscent of those assigned in Haïk (1984) to NPs with other referring NPs in there scope. Following Haïk, I will assume that $NP_{i(j)}$ may indirectly bind an NP_j in its c-command domain. For the purpose of this paper, I will further assume that bound pronouns are licensed by direct or indirect A-binding at s-structure.[3] Note that this condition is at the same time stricter and more permissive than the original c-command condition of Reinhart (1983).

Dependent indices are assigned to (5a) as shown in the s-structure (13), where $t_{i(j)}$ indirectly binds it_j as required by the A-binding condition.

(13) [$_{IP}$ [$_{NP}$ every pilot [$_{CP}$ that$_{i(j)}$ [$_{IP}$ t$_{i(j)}$ shot at it$_j$]]]$_{i(j)}$
[$_{VP}$ hit [$_{NP}$ some MIG [$_{CP}$ that$_{j(i)}$ [$_{IP}$ t$_{j(i)}$ chased him$_i$]]]$_{j(i)}$]]

The grammaticality of (5b) suggests that contrary to an assumption made by Haïk, Indirect Binding may license the bound variables of inherent quantifiers like *every N'* as well as those of non-inherent quantifiers like *some N'*.

No dependent indices can be assigned in (6), since the matrix object does not contain a variable bound by the matrix subject and is hence referentially independent of the latter phrase. (14), the full s-structure of (6a), shows that in the absence of indirect binding, the subject-embedded pronoun remains unbound. This violation of the A-binding condition on bound pronouns is responsible for the ungrammaticality of (6).

(14) *[$_{IP}$ [$_{NP}$ every MIG [$_{CP}$ that$_i$ [$_{IP}$ t$_i$ chased him$_j$]]]$_i$ [$_{VP}$ hit
[$_{NP}$ some pilot]$_j$]

Without relying on LF-movement, the theories of Indirect Binding and Dependent Indices Assignment together account for the contrast in May's data involving pronouns bound by non-c-commanding antecedents.[4]

The theory developed here also enables us to reinterpret Jacobson's evidence for a syntactic rule of Pronominalization, i.e. the contrast between (1a) and (1b). Both sentences satisfy the requirements for Dependent Indices Assignment, the result of which is shown in (15).

(15) a. [$_{IP}$ [$_{NP}$ the woman [$_{CP}$ who$_{i(j)}$ [$_{IP}$ t$_{i(j)}$ loved
him$_j$]]]$_{i(j)}$ [$_{VP}$ saw [$_{NP}$ the man who wrote to
her$_i$]$_{j(i)}$]]

b. *$[_{IP}$ $[_{NP}$ the woman $[_{CP}$ (who$_{i(j)}$) $[_{IP}$ he$_j$ loved t$_{i(j)}$ $]]]_{i(j)}$ $[_{VP}$ saw $[_{NP}$ the man who wrote to her$_i]_{j(i)}$ $]]$

In (15a), *him$_j$* finds an indirect A-binder in *t$_{i(j)}$*, and an interpretation of the pronoun as a variable bound by and coreferent with the non-c-commanding matrix object does therefore not violate the A-binding condition on bound variables. In (15b), on the other hand, there is no such A-binder for *he$_j$* since neither the matrix object nor *t$_{i(j)}$* c-command the pronoun. Note that *who$_{i(j)}$* is in an A'-position and hence not a possible A-binder. As a consequence, coreference between the subject-embedded pronoun and the object in (15b) is excluded as a violation of the A-binding condition on bound variables.

According to the argument in this paper, the contrast in (1) does not motivate a syntactic rule of Pronominalization that inserts pronouns in lieu of (some) full NPs. The apparent crossover effects in Bach-Peters sentences follow from an independently motivated theory of Indirect Binding that is parasitic on Dependent Indices Assignment. We are left with no syntactic facts that support Pronominalization, a desired result in the light of the standard arguments against this rule.

FOOTNOTES

[1] Jacobson also adduces semantic arguments for Pronominalization. Like the syntactic argument discussed below, these involve Bach-Peters sentences. But Jacobson notes that "there has been little agreement about the meaning of [Bach-Peters sentences], and so arguments based solely on semantic considerations are bound to remain inconclusive" (Jacobson (1977:2)).

[2] Alternatively, we could assign pronouns complex representations at LF and rule out weak crossover violations at this level. The following simplified LF representations for (1ab) are adapted from Jacobson (1991).

(i) the woman, x [who$_x$ [t$_x$ loves f(x)]] saw the man who wrote to x.

(ii) the woman, x [who_x [f(x) loves t_x]] saw the man who wrote to x.

In (i-ii), the subject embedded pronouns are replaced by *f(x)*, where *f* is a variable whose value is the function of the object embedded predicate. (ii) again violates weak crossover under some formulation of that constraint.

The problem with the representations in (i-ii) is that they introduce variables into the object-language. Adopting a "No Essential Variables" approach, Jacobson (1991) rejects such representations and a syntactic explanation for the contrast in (1). She instead translates subject embedded pronouns into meta-language variables of type **<e,e>**. and specifies a type-shifting operation that shifts a two-place predicate like *love* from a function of type **<e,<e,t>>** to a function of type **<<e,e>,<e,t>>** with the meaning $\boldsymbol{\lambda F[\lambda x[\mathrm{LOVE}(F(x))(x)]]}$, where F is a variable of type **<e,e>**. The mirror image of this type-shifting operation does not exist: There is no rule that shifts *love* from a function of type **<e,<e,t>>** to a function of type **<<e,t>,<e,e>>** with the meaning $\boldsymbol{\lambda F[\lambda x[\mathrm{LOVE}(x)(F(x))]]}$. Since the second argument (i.e. the subject) of *love* is always of type **e** and subject embedded pronouns are of type **<e,e>**, (1b) has no wellformed semantic translation. The first argument (i.e. the object) on the other hand may be of type **<e,e>** and (1a) is thus wellformed.

It is obviously impossible to do Jacobson's theory justice in a footnote. Let me nevertheless point out that it is crucial for her approach to exclude the second type-shifting rule. Yet this can be done only by means of stipulation. Insofar as the syntactic theory advocated in this paper does not rely on similar brute force mechanisms, it seems to be superior.

3 This raises the question of circularity, since (12) assigns dependent indices only to NPs containing bound variables and the bound variable interpretation of certain pronouns hinges in turn on the assignment of dependent indices, as we will see immediately. However, this circularity is only apparent since indices are assigned at d-structure and bound variables do not have to be licensed before s-structure. Hence all pronouns may be freely interpreted as bound variables when dependent

indices are assigned. It is only later that their status is checked with respect to A-binding.

4 However, other examples of pronouns bound by non-c-commanding NPs cannot be explained in this way. The following examples are taken from Hornstein & Weinberg (1990).

(i) a. Kennedy's aide volunteered to support him but D'amato's secretary has not.
b. *... but [$_{IP}$ [$_{NP}$ [$_{NPSpec}$ D'amato$_i$'s] secretary] [$_{VP}$ has not volunteered to support him$_i$]]
(ii) a. Every senator's aide will support him and every congressman's secretary will too.
b. ... and [$_{IP}$ [$_{NP}$ [$_{NPSpec}$ every congressman$_i$'s] secretary] [$_{VP}$ will support him$_i$ too]]
(iii) John [$_{VP}$ criticized [every senator]$_i$ in private] while praising [the bastard]$_i$ in public.

(i) shows that sloppy identity between the unquantified specifier of the subject and the deleted pronoun is impossible, a fact that indicates that the subject specifier does not c-command the rest of the clause. A sloppy identity reading becomes available with a quantified subject specifier (cf. (ii)). Moreover, (iii) shows that a VP-embedded quantifier may bind a VP-external epithet. Indirect Binding is not an option in either of these cases. Hornstein and Weinberg adopt May's view and conclude that (ii,iii) are grammatical because c-command is obeyed at LF after QR has applied. In the light of the above arguments against this position, I favour a solution that abandons c-command or binding as the structural restriction on bound pronouns. In Rohrbacher (1991), I develop such an approach based on precedence and scope instead of binding, where quantifier scope is not marked by LF-movement, but indexing (cf. van Riemsdijk & Williams (1981)). The choice between binding and precedence/scope as the structural relation(s) involved in the licensing of bound variable interpretations for pronouns is irrelevant for the topic of this paper.

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ESCOL '91 313-324

THE SUBSET PRINCIPLE AND THE ACQUISITION OF THE "LONG DISTANCE" REFLEXIVE SIG IN ICELANDIC

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In this talk, we report the results of an experimental study on the interpretation of anaphors and pronouns by Icelandic speaking children.[1] In a previous study, reported in Hyams and Sigurjónsdóttir (1990), we presented the results of an act-out task on Icelandic speaking children's performance on the so-called "long distance" reflexive sig and pronouns.[2] That study raised a number of questions which we address in the present study. There are three issues that we would specifically like to discuss. The first one is related to the prediction of the Subset Principle (cf. Berwick, 1982; and Wexler and Manzini, 1987), which is given in (1):

(1) The learning function maps the input data to the value of a parameter which generates a language:
  a) compatible with the input data, and
  b) smallest among the languages compatible with the input data

The Subset Principle predicts that a child will never move from a more inclusive to a less inclusive language. It also predicts that children will take the less inclusive language as the default or unmarked case, the value assumed in the absence of evidence to the contrary. With regard to anaphor binding, then, the Subset Principle predicts that all children will start out by first assuming local binding for reflexives. This should be true even in those languages which license long distance binding, such as Icelandic. This result has been reported by Lee and Wexler (1987) for Korean which is also a long distance anaphor language. In this study we will report experimental results which suggest that the long distance reflexive sig in Icelandic has two different functions depending on the verb that governs it. We will propose that with one class of verbs, the long distance reflexive sig functions like a pure anaphor which optionally undergoes long distance movement at the level of Logical Form (cf. Lebeaux, 1983; Chomsky, 1986; and Pica, 1987). With these verbs, we find most of our youngest children constrained by the Subset Principle. With the other class of verbs, we will propose that the long distance reflexive sig functions like a lexical pronominal anaphor which is not subject to the prediction of the Subset Principle.[3]

The second issue that we will discuss concerns the apparent developmental delay of Principle B as compared to Principle A of the Binding Theory, which a number of cross-linguistic acquisition studies have reported, for example, Wexler and Chien (1985) and Chien and Wexler (1987) for English speaking children, Lee and Wexler (1987) for Korean speaking children and Jakubowicz and Olsen (1988) for Danish speaking children. Thus, children allow local binding of pronouns in apparent violation of Principle B, though they perform well with regard to Principle A. In this study, we will show that Icelandic speaking children also show this delay.

Our third concern is a methodological one, that is we will be comparing individual children's performance on an act-out task and a modified judgement task. Our results suggest that act-out tasks may severely overestimate children's

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knowledge and/or obedience to Principle B of the Binding Theory (see Grimshaw and Rosen (1990) who raise the issue of knowledge vs. obedience). We conclude that an act-out task really only tells us that a child prefers a particular antecedent, whereas a judgement task can identify the range of possible antecedents, and hence, gives an understanding of the child's underlying linguistic knowledge.

Before turning to our study, let us review some basic binding facts in Icelandic. Icelandic has two reflexive elements, a compound reflexive and a simple form.[4] The compound reflexive sjálfan sig must take a local antecedent, as is illustrated in (2), and hence, behaves in all relevant respects like the English anaphor himself/herself.

(2) Jón$_i$ segir [að Pétur$_j$ elski sjálfan sig$_{*i,j}$]
John says that Peter loves himself

On the other hand, as first outlined in Thráinsson (1976a,b), the simple form sig in Icelandic can take a long distance antecedent when the clause that contains sig is subjunctive or infinitive, as in (3).[5] In (3) sig may also take a local antecedent as indicated by the subscripts. However, if sig is contained in an indicative clause, it can normally only refer to the local antecedent.

(3) Jón$_i$ vildi [að Pétur$_j$ rakaði$_{(subj.)}$ sig$_{i,j}$ á hverjum degi] (raka-verb)
John wanted that Peter shaved SIG (=John/Peter) everyday
"John wanted Peter to shave SIG everyday"

Another fact about Icelandic, not as well known, is that there seem to be two classes of verbs.[6] One which allows the long distance reflexive sig in a complement clause to take either a local or a long distance antecedent, as just discussed in (3). The verb raka "to shave", as in (3), is a member of this class. In our study 80% of our adult controls allowed sig to take both the local and the long distance antecedent in sentences like (3). We will refer to this class of verbs as the raka-verbs.

The other class of verbs, in contrast, strongly biases towards the long distance antecedent. With the verb gefa "to give", for example, it is entirely unnatural for sig to take a local antecedent, that is Peter in (4). Note that sig takes the form sér in the dative case.

(4) Jón$_i$ vildi [að Pétur$_j$ gæfi$_{(subj.)}$ sér$_{i,(?*)j}$ bók í jólagjöf] (gefa-verb)
John wanted that Peter gave SIG (=John) a book for Christmas
"John wanted Peter to give SIG a book for Christams"

In fact 80% of our adult controls reject the local antecedent as ungrammatical with these verbs in sentences like (4) even though they are strongly biased towards such a reading. We will refer to verbs of this class as the gefa-verbs. Hence, in Icelandic, the long distance reflexive sig functions differently depending on the verb that governs it. In our study, we considered the lexical effects of these two different verb classes on the interpretation of the long distance reflexive sig in Icelandic.

Turning to our study, which was carried out in Reykjavík, Iceland in the spring of 1991, we tested 55 Icelandic speaking children between the ages of 3;3 to 6;0 years old, and 10 adult controls, on their interpretation of the local reflexive

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sjálfan sig, the long distance reflexive sig, and pronouns. A description of the subjects tested is given in (5):

(5) Description of subjects:

Age group	Age	Mean age	Number of subjects		
			Girls	Boys	
G1	3;03:01-4;00:00	3;07:16	8	7	= 15
G2	4;00:01-4;06:00	4;03:12	5	5	= 10
G3	4;06:01-5;00:00	4;09:21	5	5	= 10
G4	5;00:01-5;06:00	5;03:00	5	5	= 10
G5	5;06:01-6;00:00	5;09:13	5	5	= 10
Adults	Adults	41;03:13	5	5	= 10
			33	32	= 65

The subjects were tested on both an act-out task and a modified judgement task, developed by Crain and McKee (1987). In both tasks, the children heard the same target sentences. The types of sentences tested are given in (6):

(6) Table 1: Types of sentences tested in the study:

	raka-verbs			gefa-verbs		
	sjálfan sig	sig	pronoun	sjálfan sig	sig	pronoun
indicative	x	x	x	x	x	x
subjunctive	x	x	x	x	x	x
infinitive	x	x	x	x	x	x

As outlined in (6), there were three factors in the experimental design. First, we varied the mood/tense of the complement clause, and tested complex sentences with indicative, subjunctive and infinitival complements. Second, there were three types of referentially dependent elements tested sjálfan sig, sig, and pronouns. Finally, we tested verbs of both the raka-class and the gefa-class.

The act-out task was the Simon-Says-Game, developed by Wexler and Chien (1985), in which children are asked to perform an action given in a sentence. The target sentence was preceded by an introductory sentence, as in (7):

(7) Introductory Sentence: Donald Duck, Fred Flintstone and [child's name (boy)]
are very dirty because they were outside playing in the mud

Test Sentence: Andrés Önd segir [ ] að þvo(inf. raka-verb) honum
Donald Duck tells [child's name (boy)] to wash him

Thus, in sentence (7), the child had to wash either himself (the local antecedent), Donald Duck (the long distance antecedent), or Fred Flintstone (the extra clausal referent).

In the judgement task, the same type of sentences were presented. However, as illustrated in (8), in the judgement task the child hears the same sentence three times following three different scenarios, a local scenario, a long distance scenario and an extra-clausal one.

(8) Table 2: Types of sentences and scenarios tested in the judgement task:

	raka-verbs									gefa-verbs								
	sjálfan sig			sig			pronoun			sjálfan sig			sig			pronoun		
	Local	LD	EC	Local	LD	EC	Local	LD	EC	Local	LD	EC	Local	LD	EC	Local	LD	EC
indicative	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
subjunctive	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
infinitive	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

A puppet 'described' the staged event and the child had to judge whether the puppet's sentence was a correct or an incorrect description of the staged scenario. An example from the judgement task, using the local reflexive sjálfan sig, is given in (9):

(9) Dino, Batman and the Dog were swimming in the Vesturbæjar-swimmingpool. Dino and the Dog didn't have any clothes on, but Batman went swimming in his Batman costume. The Batman costume was all wet and Dino feared that the costume would be destroyed. Dino said to Batman: "Oh, I want you to dry yourself", and look what Batman did!

Scene (Local): Batman dries himself

Test Sent: Dínó vildi [að Batman þurrkaði$_{\text{(subj.raka-verb)}}$ sjálfum sér]
Dino wanted that Batman dried himself
"Dino wanted Batman to dry himself"

In this example, the scene matches the puppet's description, and a child who knows that sjálfan sig requires a local antecedent in accordance with Principle A should judge the puppets description of the scenario as correct. In (10), the same sentence is tested now following a long distance scenario:

(10) Donald Duck, Jerry and Pluto were playing in the yard. Jerry sprayed water on Donald Duck. Donald Duck started to cry, and said to Jerry: "Oh, I want you to dry me", and look what Jerry did!

Scene (Long Distance): Jerry dries Donald Duck

Test Sent: Andrés Önd vildi [að Jenni þurrkaði$_{\text{(subj.raka-verb)}}$ sjálfum sér]
Donald Duck wanted that Jerry dried himself
"Donald Duck wanted Jerry to dry himself"

In this case, the staged event does not match the puppet's description, and a child who knows and obeys Principle A of the Binding Theory should judge the puppet's description of the staged scenario as incorrect, since the local reflexive sjálfan sig can not take a long distance antecedent, that is Donald Duck in (10).

Let us now present the results. In what follows, we will be presenting an analysis of individual subjects, that is we will be concerned with particular children's performance on the two tasks. We feel that this is important, since the grammar is something that is represented in the mind of an individual, and experimental acquisition studies that only look at group data can be misleading, since they may fail to reveal significant aspects of the developing grammar.

Let us turn first to the question of the delay of Principle B as compared to Principle A. For the purpose of this analysis, we excluded those children who did not seem to know that the local reflexive sjálfan sig was an anaphor and a pronoun a pronoun, as determined by an independent analysis. The number of children who are included in our analyses is given in (11).

(11) Table 3: Number of children in each age group who know that **sjálfan sig** and sig are anaphors and pronouns are pronouns:

	Sjálfan sig	Sig	Pronouns
G1	8 (out of 15) or 53%	6 (out of 15) or 40%	11 (out of 15) or 73%
G2	10 (out of 10) or 100%	7 (out of 10) or 70%	9 (out of 10) or 90%
G3	10 (out of 10) or 100%	9 (out of 10) or 90%	9 (out of 10) or 90%
G4	9 (out of 10) or 90%	8 (out of 10) or 80%	10 (out of 10) or 100%
G5	10 (out of 10) or 100%	10 (out of 10) or 100%	9 (out of 10) or 90%
Adults	10 (out of 10) or 100%	10 (out of 10) or 100%	10 (out of 10) or 100%

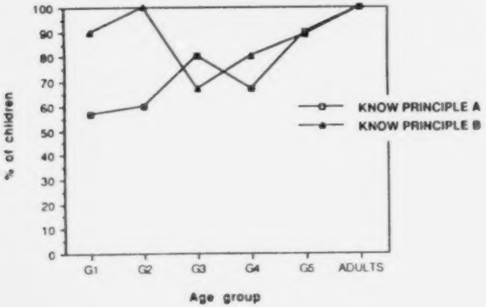
The Figures in (12) and (13) show the number of children who demonstrate knowledge of Principles A and B of the Binding Theory. The criterion for knowledge of the relevant principle for both the judgement task and the act-out task was five correct judgements or responses out of six. The Figure in (12) reflects children's knowledge of the principles according to the act-out task and shows that most of the children in each age group seem to know both Principles A and B, that is the children seem to know that the anaphor sjálfan sig has to be locally bound and pronouns locally free. Hence, in the act-out task, the children do not show a delay of Principle B as compared to Principle A. Notice, that in the judgement task represented in (13), the results are quite different. Here we do find a delay of Principle B with respect to Principle A for many children. Thus, the judgement task which taps a child's multiple interpretations of a sentence shows that children do readily accept a local antecedent for a pronoun, though this is not their preferred interpretation as seen in the results of the act-out task. These results replicate the results of many studies on the acquisition of binding, and show that Icelandic speaking children allow local binding of pronouns in apparent violation of Principle B of the Binding Theory. Our results also replicate those of McDaniel et al. (1987), who also compared the results of an act-out task and a judgement task, and concluded that act-out tasks may severely overestimate children's knowledge and/or obedience of Principle B. Notice, that since our study did not include sentences with quantified antecedents, we can not speak to the issue of whether the children are allowing local coreference of pronouns as opposed to local binding, as claimed by Chien and Wexler (1988 and 1990) and Grodzinsky and Reinhart (1990).

Let us now turn to the long distance reflexive sig. We should note that we are not going to discuss the results of sig in the infinitive, nor the results for the indicative with the gefa-verbs, since these cases introduce complications which would be beyond the scope of this paper. As noted earlier, adults treat sig differently depending on the verb that governs it. The results for sig with the raka-verbs in subjunctive sentences are given in (14) and (15). Looking at Figure 3 in (14), we see that 70% of the adults prefer the long distance interpretation of the reflexive sig in the act-out task. In the judgement task given in (15), the subjects show several different grammar types. Again focusing our attention on the results for the adult controls, we see that 80% of them allow both a local and a long distance interpretation of the reflexive sig with the raka-verbs. Thus, although the act-out task shows that most of the adults prefer the long distance antecedent, the

Act-out task

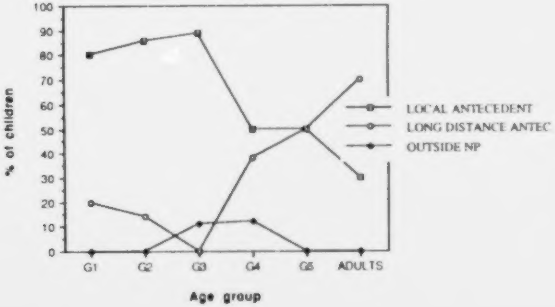
(12)

FIGURE 1: Act-out task: Children who know Principles A and B according to their performance on själfan sig and pronouns



(14)

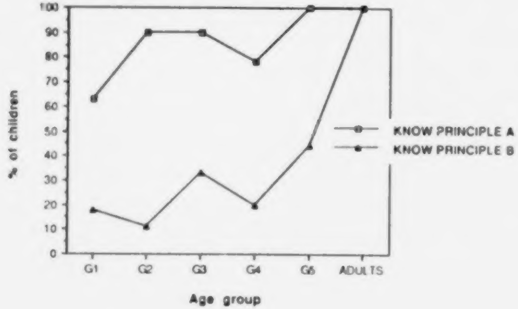
FIGURE 3: Act-out task: SIG in subjunctive sentences with raka-verbs



Judgement task

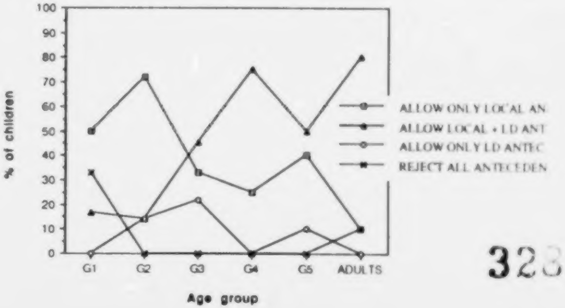
(13)

FIGURE 2: Judgement task: Children who know Principles A and B according to their judgements of själfan sig and pronouns



(15)

FIGURE 4: Judgement task: SIG in subjunctive sentences with raka-verbs



judgement task which we take to reflect their actual grammatical knowledge shows that both the local and the long distance interpretation are grammatical. This result suggests to us that sig with this class of verbs in adult Icelandic functions like a pure anaphor which optionally undergoes long distance movement at the level of Logical Form. Thus, following Pica (1987), we assume that pure anaphors are heads, which can optionally undergo successive cyclic movement to a higher INFL position at the level of Logical Form, and hence, may take either a local or a long distance antecedent.

Turning to the children responses, we see in (14), that in the act-out task children overwhelmingly prefer the local antecedent for the long distance reflexive sig. The Figure shows that the children choose the local antecedent 80-90% of the time in age groups G1 to G3. Hence, these results are consistent with the prediction of the Subset Principle, especially since the adults are preferring the long distance interpretation. Now look at the children's judgements in (15). We see that only 14-17% of the children in the two youngest age groups allow both the local and the long distance interpretation of sig, but the number of children with this grammar increases to adult level by G4, where 75% of the children allow both antecedents. Notice, that by G3, we see an increase in the acceptance of long distance responses for many children. This is the age at which we assume that many Icelandic children develop a long distance movement analysis of sig. On the other hand, many more children, or 50-72% in the youngest age groups allow only a local antecedent for sig, and the number of children who fall into this category gradually decreases over time. We interpret this result as providing strong support for the Subset Principle. Note, that here we are not talking about preference, as revealed in the act-out task, but actual grammaticality judgements which we take to provide stronger support for the Subset Principle.

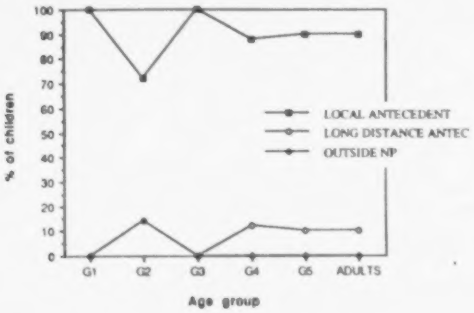
Notice now that the children's performance on subjunctives, given in (15), and indicatives, presented in (17), diverges sharply around G3, or when the children are 4;6-5;0 years old. In the subjunctive, the children appear to begin to move away from a Subset grammar, whereas in the indicative they develop a strong preference for the local antecedent. Recall that in the adult grammar, the reflexive sig can not take a long distance antecedent in the indicative, and this is refered to as the Indicative Constraint. Our results indicate that children manifest knowledge of the Indicative Constraint around G3. It is for this reason that we see in (17) a huge jump in the number of children who allow only the local antecedent at this age. Note, that the Indicative Constraint is a negative constraint, that is, it specifies that you can not move out of an indicative clause. Given the presumed unavailability of negative evidence, we would not expect it to be a learned constraint. Also, when we consider the very abstract nature of this constraint, in particular, the fact that it is a constraint on movement at the level of Logical Form, linguistic theory leads us to expect that such a constraint would be innate. We believe that our results speak directly to this issue. Notice, if you look at the Figure in (15), that by G3 many more children adopt a movement analysis of sig, that is they start to allow a long distance interpretation of sig. This is precisely the point at which we see the Indicative Constraint come into play in (17). This indicates to us that the Indicative Constraint is triggered into operation by the availability of the long distance movement and need not be acquired as a separate principle.

Finally, let's turn to the Figures in (18) and (19) which give the results for sig with the gefa-verbs in subjunctive sentences. Focusing our attention on the adult responses, we see that in the act-out task, all the adults prefer the long distance antecedent for sig, and in the judgement task, 80% of the adults allow only

Act-out task

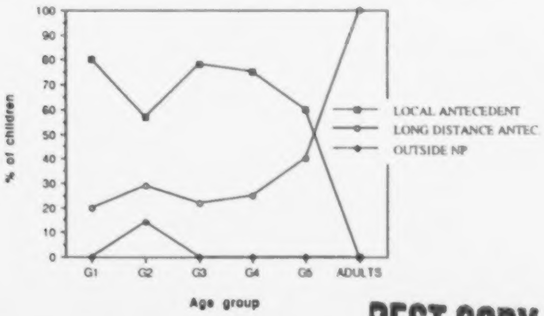
(16)

FIGURE 5: Act-out task: SIG in indicative sentences with raka-verbs



(18)

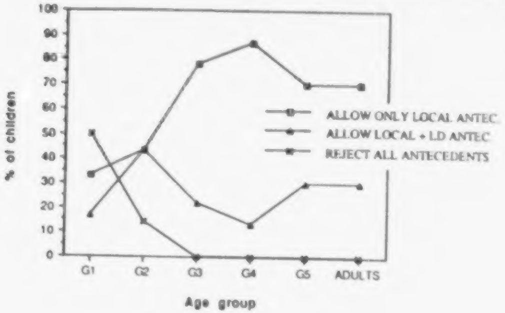
FIGURE 7: Act-out task: SIG in subjunctive sentences with gefa-verbs



Judgement task

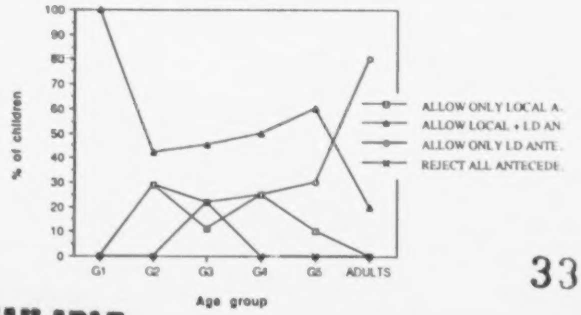
(17)

FIGURE 6: Judgement task: SIG in indicative sentences with raka-verbs



(19)

FIGURE 8: Judgement task: SIG in subjunctive sentences with gefa-verbs



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a long distance interpretation of sig. These results diverge sharply from the results for the children. In the act-out task, we see that 57-80% of the children in all age groups prefer the local antecedent for sig, and in the judgement task, all the children in the youngest age group and 42-60% of the children in age groups G2 to G5 allow both a local and a long distance interpretation of sig. We will argue that these results are consistent with the analysis, proposed in Hyams and Sigurjónsdóttir (1990). In that paper, we propose that the gefa-verbs assign a pronominal feature to sig, and that with this class of verbs sig functions like a lexical pronominal anaphor. Our analysis is based on the reformulated Binding Theory of Chomsky (1986), and follows the analysis of Hestvik (1990) for Norwegian and Lee (1986) for Korean. Briefly, on the reformulated Binding Theory a lexical element can have the feature combination [+anaphoric, +pronominal], since the binding domains for these two features are different. Following Hestvik, we assume that a pronominal anaphor has to satisfy Principle B of the Binding Theory at S-structure, and Principle A at the level of Logical Form. Hence, in example (20), sig has to be locally free, that is free from Mary in order to satisfy Principle B at S-structure. However, given its anaphoric features, sig must also be bound, and by undergoing long distance movement at the level of Logical Form it satisfies Principle A by binding to the matrix subject, that is John in (20):

(20) Jón$_i$ vildi [að María$_j$ klappaði sér$_{i,}$ (?*)$_j$ á kinnina] (gefa-verb)
John wanted that Mary patted SIG on the cheek
"John wanted Mary to pat SIG on the cheek"

Hence, it follows from this analysis that sig with the gefa-verbs in adult Icelandic can only take a long distance antecedent. Notice, that we do not expect to find Subset Principle effects with sig when governed by the gefa-verbs, since sig with these verbs requires a long distance antecedent and hence, there is no parametrization involved. This prediction seems to be born out, since the majority of the children allow both a local and a long distance interpretation of sig with the gefa-verbs, and hence do not seem to have a Subset grammar.

In our 1990 paper, we further propose that the results we obtain for Icelandic sig are directly related to the results for the pronouns. We predict that children who know and obey Principle B of the Binding Theory, as evidenced by correct performance on pronouns, will have the correct long distance interpretation for the pronominal anaphor sig whose binding properties follow from the application of both Principle A and Principle B. The opposite pattern is also expected. Thus, we predict that if children do not know or obey Principle B and allow local binding of pronouns, they will also allow local binding of the pronominal anaphor sig. This prediction is borne out in our study. Recall, that in this study, the majority of the children do allow local binding of pronouns and these same children also allow local binding of the pronominal anaphor sig. However, in order to test our hypothesis that the results for sig are related to the results for the pronouns, it is necessary to do an analysis of individual subjects which compares each individual child's performance on sig with his or her performance on pronouns. The Table in (21) illustrates how many children adhere to our hypotheses and how many do not. Cells A and D are the ones that support our analysis.

(21) Table 4: Children's judgements on SIG are related to their judgements on pronouns:

		Pronoun		
		Do not allow local binding	Do allow local binding	
SIG	Do not allow local binding	6 A	3 B	9 A+B
	Do allow local binding	6 C	21 D	27 C+D
		12 A+C	24 B+D	36 N

As we see in (21), most of the children behave as we would expect given our pronominal anaphor analysis of *sig*. A Fisher's exact probability test indicates that our hypothesis is supported, that is whether or not children allow *sig* to be locally bound is significantly related to whether or not they allow local binding of pronouns. This result is significant at the .02 level.

Notice, that according to our analysis the reason why so many of the children allow both a local and a long distance interpretation of the pronominal anaphor *sig*, is that these children either do not know and/or obey Principle B. We assume that as soon as these children demonstrate clear knowledge of Principle B, they will pattern as the adults do and only allow a long distance interpretation of *sig*. Hence, our analysis does not require the use of negative evidence to explain how the children move from a local and long distance grammar to the more restrictive grammar which only allows a long distance interpretation of *sig*. We take this to be a further motivation for our analysis.

To conclude, our results suggest that the long distance reflexive *sig* in Icelandic has two different functions depending on the verb that governs it. We propose that with the *raka*-verbs, *sig* functions like a pure anaphor which optionally undergoes long distance movement at the level of Logical Form (cf. Pica, 1987). Thus, although we reject the parametrization of Binding Theory in the traditional sense, that is, the parametrization of governing categories, we assume that the Binding Theory is parametrized in the sense that certain anaphors optionally undergo long distance movement at Logical Form. With these verbs, we find the majority of our children with a Subset grammar as revealed in the judgement task which we take to provide stronger support for the Subset Principle than earlier studies which were exclusively act-out tasks. Also, our results indicate that the Indicative Constraint on Icelandic *sig* is triggered into operation by the availability of long distance movement at Logical Form. However, the main theoretical implication of our study is that with the *gefa*-verbs, the Icelandic reflexive *sig* seems to function like a pronominal anaphor subject to both Principle A and Principle B of the Binding Theory. This analysis accounts for the fact that the Icelandic children's performance on the pronominal anaphor parallels their performance on pronouns. Finally, the results of our study emphasize the importance of using other techniques than act-out tasks to reveal children's understanding of anaphors and pronouns.

FOOTNOTES:

1. We would like to acknowledge the cooperation of the children and the teachers at the Hagaborg, Vesturborg and Grænaborg nursery schools in Reykjavík, and the adults who took part in the experiment. Our appreciation is also extended to our research assistants Dagný Björnsdóttir and Inga Gunnlaugsdóttir for their great job. We would also like to acknowledge Yu-Chin Chien and Rochel Gelman for their invaluable help with the statistical analyses, and the many linguists at UCLA and the University of Iceland who have commented on this work. This study was supported by a grant from the Icelandic Council of Science (Vísindaráð) and a a Doctoral Dissertation grant from the National Science Foundation under Grant No. BNS-9015428. We thank these agencies for making this study possible. All findings and conclusions expressed in this article are solely the authors' responsibility.
2. The long distance reflexive sig in Icelandic has been extensively discussed in the syntactic literature and recieved a number of treatments. See for example, Thráinsson (1976a,b) and (1991), Maling (1984) and (1986), Sigurðsson (1986), Anderson (1986), and Rögnvaldsson (1986).
3. We should mention that our analysis of the data is now (in November 1991) undergoing radical changes. Thus, we are reinterpreting the data within the Binding Theory proposed in Reinhart and Reuland (1989) and (1991). However, our new analysis and the one proposed in this paper both have in common that they aim to account for one of the most salient results of our study, that is that the long distance reflexive sig seems to be pronominal in some sense.
4. Here we do not discuss the reciprocal hvor annar "each other" which behaves in all relevant respects like the English reciprocal.
5. We abstract away from the fact that given certain discourse conditions sig need not be sentence bound at all (see for example Sigurðsson, 1986).
6. We are grateful to Höskuldur Thráinsson for first pointing out these lexical effects to us.

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ESCOL '91 325-334

REFERENCE TIME RELATIONS

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1. Hinrichs and Partee

This research extends the temporal representation models developed by Erhard Hinrichs (1981,1986) and Barbara Partee (1984) for representing the temporal structure of past-tense discourses. Their work models the progression of time through a narrative as a series of events and reference times to which the events are related. The reference times referred to here were inspired by, but are not identical to those of Reichenbach (1947). Both Hinrichs and Partee begin with the presupposition that some reference time, which is an interval of time, already exists at the beginning of a discourse. The first event is then treated as a point located within that interval. The Hinrichs and Partee models give rules for the introduction of new reference times and event insertion into the model, assuming that the narrative contains a sequence of events which are understood to occur one after another. In the general case, each event introduces a new reference time which is located temporally just after the event. The next event is placed within that reference interval, and introduces a new reference time just after itself. The representation for (1a) would then look something like (1b).

(1) **(a)** Ann woke up (e_1).
She turned on the light (e_2).
She reached for her glass of water (e_3).

(b) R_0 ———
$e_1 \ll R_1$ ———
$e_2 \ll R_2$ ———
$e_3 \ll R_3$ ———

Here we conceive of the structure occurring on a timeline running from left to right; the first event, e_1, is inserted into the current reference time, which is R_0, and a new reference time R_1 begins just after e_1. (We use the formula $x \ll y$ to represent the relation *y occurs just after x*.) The next event, e_2, is inserted into the new current reference time, R_1, and so on.

For states (and achievements and progressives) the rule is slightly different. Rather than being considered a point of time, a state is considered to be an interval, and rather than being inserted into the current reference time, a state surrounds that reference time. States also introduce no new reference times. This treatment then handles cases like (2a), with the structure in (2b).

(2) **(a)** Ann woke up (e_1).
She was very thirsty (s_1).
She turned on the light (e_2).

(b) R_0 ———
$e_1 \ll R_1$ ———
s_1 ———
$e_2 \ll R_2$ ———

Here the state s_1 surrounds the current reference time R_1, and since no new reference time has been introduced, the following event, e_2 is placed within the still-current reference time R_1. Now e_2 will also co-occur with the state s_1.

2. Problem

The Hinrichs and Partee approach deals fairly well with narratives with a strictly forward-moving chain of events (which is indeed Partee's aim). However, there are other past-tense structures which cannot be effectively handled in this way, such as subordination. For example:

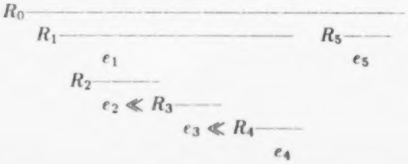
(3a) Edgar bought a new car at Freddy's (e_1). The salesman gave him information about the different types of cars (e_2), and recommended a 4-door hatchback (e_3). Edgar instead chose a convertible (e_4). Then he bought a boat (e_5).

Here we expect e2-e4 to be happening during the same time as e1. However, neither Hinrichs nor Partee has provided for events falling within the same reference time in such a situation.

3. Improvements

We suggest modifications to the system to enable it to handle subordination constructions such as (3a), and also others. The first modification is to implement a hierarchical structure of reference times, after the manner of Kamp and Rohrer (1983). Allowing for a hierarchy lets us represent narrative (3a) as in (3b), where e_1 is not given a specific relationship to the chaining events $e_2 - e_4$:

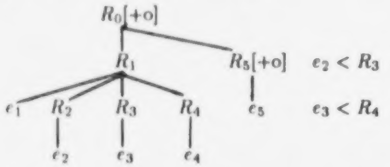
(3b)



In these cases, the first sentence provides us with an overall reference time, R_1, for the succeeding set of event sentences. We will call this a "global reference time". Each of the successive events that are part of the overall event (buying the car) will fall within the global reference time R_1. As soon as we reach an event which is not subordinated to the initial sentence, we move outside the scope of the global reference time, as with e_5 being placed outside of R_1. Under the previous analysis described, e_5 would have to be placed within a reference time located just after e_4, and there would be no reference time referring to the set of events related to buying the car, and hence no means of distinguishing subordinate events from non-subordinate events.

Since we find a tree-type structure easier to work with than the temporal graphs shown so far, we now will use trees like (3c) below as our temporal structure. We define the daughter relationship to represent containment, so that a daughter is contained within the time represented by its parent node. We may augment the usual tree structure with sets of equations like those to the right of the tree to indicate temporal ordering between nodes. The [+o] notation will be described later.

(3c)



Under this notation, the relation *x subordinates y* is defined as *x is a sister of the reference time of y*, where *y* is a leaf node (i.e. has no daughter nodes).

Contrary to the usual view of such subordinations, we do not claim that these are cases of event decomposition, i.e. that the first sentence introduces an event which is broken down into the events described in the following sentences. We claim that the first clause is part of the same reference time as its subordinate clauses. The justification for this is passages such as (4), in which the events described in the subordinate clauses extend beyond the scope of the introducing event.

(4) Edgar bought a new car (e_1). He sold his station wagon (e_2), went to the Volvo dealer (e_3), and paid cash for a 1991 model (e_4).

Here it does not seem appropriate to say that e_2 is an event in the decomposition of e_1, but simply that it is temporally connected with it (and of course, topically connected with it). This is why we require a reference time to contain both e_1 and the subordinate events, rather than having $e_2 - e_4$ be daughters of e_1.

We get the mechanism for the subordination structure by maintaining a set of available reference nodes, rather than just one such node. The Hinrichs and Partee models refer to "the current reference time", and the next event is interpreted relative to that time, whereas we refer to "the available (or open) reference times", and interpret the next event with respect to that set of times. We have also found it preferable to introduce reference times only as they are needed, rather than in anticipation of the next item. This is because we now allow more slots for insertion, and producing all the possible insertion sites beforehand would be computationally more complex than simply producing the one which is required by the discourse.

The insertion rules, written in the manner of Hinrichs' rules, are given below. We assume (as do Partee and others) that the discourse itself introduces an initial reference time, R_0, or $node_0$[+open]. For each successive event (or state) e_i, event insertion is performed, where j is the highest numbered node. The way this system works is the following: (1) an event introduces a new (open) node corresponding to a reference time; (2) the reference time node may be interpreted as a subinterval (daughter) of any open reference time R; (3) a node representing the event or state is introduced (4) the event node is inserted as a a subinterval (i.e. daughter node) of the reference time node, or the state node is inserted as superinterval (parent node) of the reference time; and (5) all other daughters of R are then marked as not open. There is then also a set of pragmatically- (and perhaps also linguistically-)controlled rules for determining which of the open nodes the reference-time node should be attached to, and for introducing the temporal ordering equations. The idea of "open" nodes as allowable attachment sites is used by Webber (1991) in similar trees for representing relations of discourse structure.

Event insertion

For each event e_i, perform the following, with $node_j$ such that $\forall\ node_y,\ j \geq y$, and $\rightarrow$ means "introduces", and $x \subset y$ means "x is contained in y":

1. $e_i \rightarrow node_{j+1}$[+open] (an R-node)
2. $node_x \subset node_{j+1}$, for some $node_x$ which is [+open]
3. $e_i \rightarrow node_{j+2}$ (an e-node or s-node)
4. (a) $node_{j+2} \subset node_{j+1}$ (if e_i event) OR
   (b) $node_{j+1} \subset node_{j+2}$ (if e_i state)
5. $(node_{j-n} \subset node_x \wedge n \geq 0) \Rightarrow node_{j-n}$ [-open]

States are treated differently from events in that instead of being inserted as a daughter of the reference time they introduce, they are inserted as a parent of the reference time. The motivation for this and examples of state-insertion are given in section 4.1.

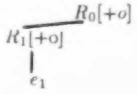
This model additionally requires a set of pragmatic/linguistic rules for indicating which of the current open nodes is appropriate for the particular context. These rules might be based on the sort of rules found in Lascarides and Asher (1991), which indicate the temporal orderings for discourse relations such as causation. Note that discourse relations are not represented in this system, but discourse relations can be used as a tool for determining temporal ordering, and the temporal ordering possibilities could be used to help constrain the discourse options.

4. Examples

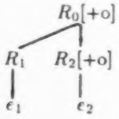
We now show how this model can represent the temporal structures of various kinds of constructions. First we show that we can still represent the simple forward-chaining narrative. (5b)-(5d) show the step-by-step building of the tree structure for the 3-event passage (5a). (In our diagrams, we only explicitly mark the [+open] feature. Nodes that are not explicitly marked should be understood to have the feature [-open].)

(5) **(a)** Ann woke up (e_1).
She turned on the light (e_2).
She reached for her glass of water (e_3).

(b)

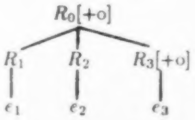


(c)



$e_1 < R_2$

(d)



$e_1 < R_2$

$e_2 < R_3$

Tree (5b) shows the tree after the insertion of the first event, e_1. (Recall that the tree begins with the node R_0 marked as [+o].) Event e_1 introduces the node R_1, marked [+o], and inserts it as a daughter of the only available open node, which is R_0. Then a node representing the event interval is inserted as a daughter of R_1. There are now two open nodes available for insertion of the next event. Since we understand the two items to occur in succession and not in a subordination relation, the reference time for e_2 is inserted under R_0 and not R_1. At this point, all other daughters of R_0 are marked as not open, so R_1 now becomes unavailable for attachment. A similar process occurs for adding e_3, and the final tree is shown in (5d).

4.1 States

The treatment for states here is similar to that of Partee, in that when a state is introduced, it includes a reference time rather than being included as a subinterval of a reference time. However, we allow states to introduce their own reference times, in the same way that events do, whereas Partee's model requires the state to be related to the reference time introduced by the previous event in the discourse, and not introduce any reference time. The advantage to Partee's representation is that it correctly predicts that there is no time gap between a state and the previously-mentioned event. The advantage to our representation is that we can represent the whole range of possible relations of states to events. (These possibilities are described below.) Part (4b) of the insertion rule treats the stative as meaning that some part of the state is true during the reference time being described. Notice that this representation does not require, as does Partee's, that the state be true at the same time as the next event described, nor as does that of Dowty (1986), that the state be true after the previously-described event. It seems appropriate for the generalized case that the state not be required to hold in one or the other direction, because there are cases of each usage. The sentences in (6) illustrate the various possible relationships between state and event. (e_1 and s_1 represent the time interval during which the event or state holds.)

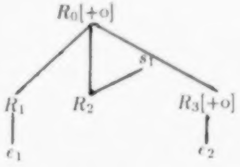
(6) **(a)** Louise yawned (e_1). She was tired (s_1). $e_1 \subset s_1$
(b) Louise sang an aria (e_1). It sounded terrible (s_1). $e_1 = s_1$
(c) Louise turned off the light (e_1). The room was very dark (s_1). $e_1 \ll s_1$
(d) Louise Jackson died last week (e_1). She was a resident of Reston (s_1). $s_1 \ll e_1$
(e) Louise sang an aria (e_1). The audience was delighted (s_1). $(e_1 \cap s_1) \neq \emptyset$
(f) Louise ate the entire pizza herself (e_1). She was ravenously hungry (s_1). $(e_1 \cap s_1) \neq \emptyset$

In (6a) above, the time of the event is contained within the time of the state. In (6b) the event and the state strictly co-occur. In (6c) the state only becomes true after the previous event in the passage (inchoative use). In (6d) the state was true only before the event. In (6e) the state could begin any time before the end of the event, including before the event began. In (6f) the state is understood to hold before the event begins, and to continue on until some point during the event interval. However, these orderings can only be understood through pragmatic inferences, and so we add ordering equations to say that the reference time introduced by the state has some ordered relationship to the surrounding events, in the case of the true stative use, or that the node representing the state itself bears the "just after" relationship with the previously-mentioned event, in the case of the inchoative use. This gives our representation more flexibility than other systems, such as Partee's and Dowty's, which allow states only a single temporal interpretation. Neither Partee's nor Dowty's representation allows the relations illustrated by (6b) and (6d), and neither makes a distinction among the others.

The use of a stative (option (4b) in the rule) observed in passage (7a) is illustrated with (7b).

(7) **(a)** Ann drove home (e_1).
She was very thirsty (s_1).
She opened the refrigerator (e_2).

(b)



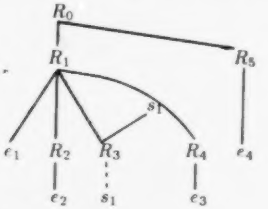
$$e_1 < R_3$$

Here the state s_1 introduces a new reference time R_2. The state then contains that reference time, which we represent by making the state a parent of R_2. (This possibility of adding another parent to a node shifts our structures from simple trees to directed acyclic graphs.) This structure indicates that some part of the duration of the state is contained within the time described by the discourse. That R_2 has two parents indicates that it is entirely contained within each of two different time intervals, such that there is some overlap between those intervals but not complete overlap. This structure allows then, any of the orderings illustrated above: the reference time which is part of the state could be ordered before the previously-mentioned event (or its reference time), indicating that the state began (and possibly even ended) before the event; the state-node interval could be equivalent to the event-node interval, indicating co-occurrence; the state could be ordered after the event interval, indicating an inchoative; or the reference time of the state could be related to the event, indicating that the state could have begun before or during the event.

All of the above relationships could also be made if the state were inserted as an event is, as a daughter of the reference time it introduces. In our model the state is not made to be a daughter of its reference time, because this would then indicate that the state can only be true during the reference time under which its own reference time is inserted. This would then predict that in (8a), the state s_1 could not still hold during R_5, whereas our understanding is that it does. If the state were inserted underneath its reference time, as indicated by the dotted line, then s_1 would be strictly contained within R_1, and R_1 has no overlap with R_5. If instead, we make the reference time R_3 be a part of the state, then the state is not required to be contained within R_1, but could continue on into R_5.

(8) **(a)** Wes played golf with his father (e_1). He played poorly for the first three holes (e_2). He was very hungry (s_1). His father suggested that they end the game after one more hole (e_3). Wes went straight to a diner (e_4).

(b)



$R_1 \ll R_5$

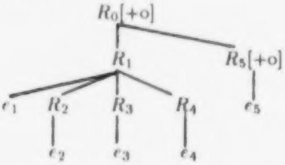
4.2 Ordered Subordination

For ease of discussion and illustration we will focus mainly on events for the rest of the paper. However, the claims we make for events we also intend to apply to states.

An example of a set of ordered events all being subordinated was introduced in (3a) and is reproduced here. The structural representation in terms of our model is given in (3c).

(3) **(a)** Edgar bought a new car at Freddy's (e_1). The salesman gave him information about the different types of cars (e_2), and recommended a 4-door hatchback (e_3). Edgar instead chose a convertible (e_4). Then he bought a boat (e_5).

(c)



$e_2 < R_3$

$e_3 < R_4$

In this case, the tree built by the introduction of the first event will look just like that in (5b). However, when the second event is inserted, it is inserted under the lowest available reference node, thus creating the subordination structure. The events e_3 and e_4 are also inserted under that same reference time, but then e_5 is inserted under the reference node higher in the tree to indicate that it is not subordinate to event e_1. Note that the augmenting equations express the linear temporal ordering between events $e_2 - e_4$, and between the set of car-buying events (R_1) and the boat-buying (R_5).

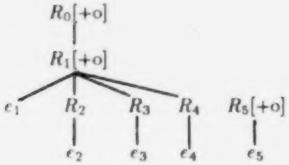
4.3 Grab-bag

It is also possible to have a subordination structure in which the events are understood to have no specified ordering. We call such constructions "grab-bag" subordinations, since they are essentially just a random listing of events which occurred in some time interval. In these cases, the structures look just like those in ordered subordinations, except that there are no appended equations to specify ordering between events. In the case of this example, all of the subsequently-mentioned events are subordinate to the first one.

(9) **(a)** Last weekend, my parents attended the annual Lilac Festival (e_1).
They admired some handcrafted items on display (e_2).
They savoured the cuisine of a local restaurant (e_3).
They applauded the clowns and street entertainers (e_4).

And of course, they took time to smell the flowers (e_5).

(b)



4.4 Adverbs

We also show how temporal adverbs are incorporated into this system. The earlier systems we looked at did not provide for events to be contained within an adverbial introduced in an earlier sentence. For example, in passage (10),

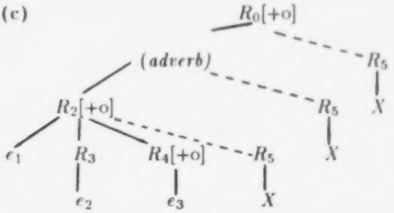
(10) Yesterday Paul got up early (e_1). He ate breakfast quickly (e_2) and hurried to the circus grounds (e_3).

we understand that each event occurs after the previously-mentioned one, and they all occur within *yesterday*. However, there is no mechanism under Hinrichs' or Partee's analysis for requiring that e_2 and e_3 occur within 'yesterday'.

In our system, it makes sense to have a node which represents the time indicated by the adverb, and to insert as daughters of this node every event which is understood to occur during that time. There is then the option of simply adding this time restriction to an existing node, or of creating a whole new node for the adverb. In order to decide between these two structures, we turn to the relational adverb, *then*. Suppose we have a passage like (11a) or (11b), where X could be any event.

(11) **(a)** At 5:00 Neal had dinner (e_1). He ate lobster and drank wine (e_2). Then X (e_3).
(b) Yesterday Neal went out to dinner (e_1). He ate lobster and drank wine (e_2). Then X (e_3).

(c)



We must be able to provide for all the possible attachments of X. It seems there are three places X could go, as shown by the dotted lines in (11c): as a subordinate clause of the dinner, attached to R_2 (for example "he had a Greek salad"); as something which occurred after the dinner, but still within the time indicated by the adverb, attached to R_1 ("he went to a movie" in (11b)); or as something which occurred outside of the adverbial reference, attached to R_0 ("he went to a movie" in (11a)). (All three positions are not necessarily possible for every adverb, but the union of all possible attachments must be allowed for.) If we assume that the adverbial simply attaches to an existing node, then we only allow for two of these attachments. However, introducing a new node for the adverb gives us all three possibilities.

4.5 Then

The following rule applies to the representation of events following temporal *then*:

The reference time for an event following *then* must be a sister R_i of some open node R_o, such that $R_o < R_i$

plus some restrictions on allowing other events to occur in between. Notice that this formulation correctly predicts that a discourse may not begin with *then*, since there is no possible sister node. For states there must also be an ordering rule saying that the state-node comes after the previous item in the discourse, since *then* indicates an inchoative use. The difference between (12a) and (12b) below is that in (12a), James' sickness could only start after his eating the mousse, whereas in (12b), the sickness could have been true during the eating.

(12) **(a)** James ate some salmon mousse. Then he was sick.
(b) James ate some salmon mousse. He was sick.

If the item preceding the *then+state* sentence is also a state, then the ordering simply requires that the second state start after the first one starts.

(13) Fran was hurt (s_1). Then she was angry (s_2).

Here it is possible for s_1 to still be true after s_2 starts to be true. Thus we do not require that s_2 come strictly after s_1, but only that the beginning-point of s_2 come after the beginning-point of s_1.

4.6 When

For the representation of *when* we again make use of the subordination structure. Hinrichs' analysis simply inserts both events within the same reference time. We agree with Hinrichs that no temporal ordering between the clauses of a *when* sentence should necessarily be specified, since we can come up with examples of every possible ordering, as shown in the following examples.

(14) **(a)** When Pam went to Chicago (e_1), she put her dog up in a kennel (e_2).
(b) When Jean made the pancakes (e_1), she used molasses in the batter (e_2).
(c) When Phil came into the house (e_1), he took his coat off (e_2).

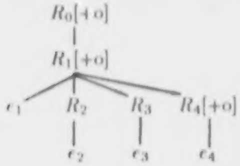
In (14a) e_2 is understood to happen before e_1, in (14b) e_2 co-occurs with e_1, and in (14c) e_2 happens after e_1. Thus we cannot require any particular ordering structure between the two events.

However, while Hinrichs simply inserts both events into the temporal representation on an equal footing, we see the need for some structural subordination between the two clauses. This is because of examples like (14):

(15) **(a)** When the president gave her speech (e_1), she first praised the American troops (e_2). Then she described her new defense program (e_3). Finally she discussed the economy (e_4).

(b) When the president gave her speech (e_1), she first praised the American troops (e_2), then she described her new defense program (e_3), and finally she discussed the economy (e_4).

(c)



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The structure of both of these passages is exactly the same: e_2 and e_3 are both subordinated to e_1, as shown in (15c). If we simply insert both e_1 and e_2 into the same reference time, we cannot correctly predict that e_2 and e_3 can then form a subordinate structure together. Hence the following claim:

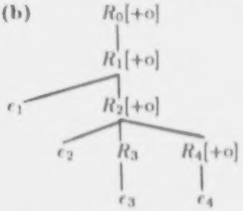
***When* triggers a subordination structure with the main-clause event subordinate to the *when*-clause event.**

4.7 Nested Subordination

It is also possible for a passage to contain nested subordination. Our rules allow for the appropriate structure for nestings, such as (16a). Here e_2 is subordinate to e_1, and e_3 to e_2. The representation for this is in (16b).

(16) **(a)** When Raymond gave his first dinner party (e_1), he made his own version of *coq au vin* (e_2). He used beer instead of wine (e_3). Otherwise, he pretty much followed the recipe (e_4).

(b)

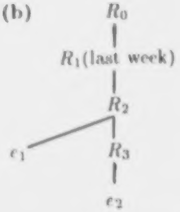


Notice that this structure also justifies our introducing a new reference node for each of the subordinate structures. Including these nodes predicts the acceptability of nested subordinations, as it allows for attachment to those reference times. Without individual reference times for the subordinate events, it would not be possible to expand any of those events further.

Other combinations of subordinations are also predicted, such as a *when*-structure modified by a temporal adverbial, as in (17).

(17) **(a)** Last week, when Stacy gave a recital (e_1), she played only modern music (e_2).

(b)



5. Conclusion

We have suggested modifications to the approach by Hinrichs and Partee to the temporal representation of discourse which allow for the representation of a wider range of data. We have shown that the modifications introduced in order to represent generalized cases of subordination are extendable to a range of specific types of subordination, and that they predict other acceptable structures.

The event insertion rules given here appear to be appropriate for discourses in which the same tense is used for all sentences. Further work could include extending the interpretation rules to cover discourses containing a variety of tenses. A more fine-grained analysis might be possible by specifying possible relations based on the aspectual classes of predicates or other syntactic and semantic factors.

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ESCOL '91 335-346

LEARNABILITY AND THE ACQUISITION OF AUXILIARY AND COPULA *BE**

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Abstract. Despite extensive semantic, syntactic and morphological similarities between copula *be* and progressive *be*, analyses of 12 children's spontaneous-speech transcripts revealed that the pattern of acquisition and types of errors were different for progressive and copula *be*. The nature of these results suggest that children's knowledge of the properties of the formal categories Lexical Verb and Auxiliary Verb leads them to distinguish between copula *be* and progressive *be*, and occasionally to treat copula *be* as a regular lexical verb that can neither invert nor negate, but that is subject to the rules of inflectional morphology.

One of the central questions in the field of language acquisition is how children form grammatical categories such as Noun and Verb. Two types of explanations have been put forth. In the first type, children are assumed to possess innate knowledge about grammatical categories. Using a procedure such as semantic or syntactic bootstrapping, children assign the individual words they hear to these categories. (For one such proposal, see Pinker, 1984.) Alternatively, children are assumed to be distributional learners who have no innate knowledge about grammatical categories. As distributional language learners, children simply record all aspects of the behavior of every word they hear. The emergence of (apparent) grammatical categories results from the fact that certain words share certain behaviors. (For one such proposal, see Maratsos and Chalkley, 1980.)

If the emergence of grammatical categories in children's grammars results solely from regularities that exist in the input language, children should not make distinctions that are not made in the language they are learning. However, it appears that children sometimes do so. The most blatant examples involve children who are exposed to a pidgin language, yet grow up speaking a creolized version of that language (c.f., Newport, 1984; Romaine, 1988). Examples from normal language acquisition in which a child makes distinctions not made in her input language are quite subtle. Imagine, for example, a child who distinguishes between transitive verbs and intransitive verbs and initially uses the present progressive tense for intransitive verbs but not transitive verbs. Such a child would not speak ungrammatically: she would simply fail to use certain constructions that the adult grammar allows (sentences such as *I am reading the book*). In fact, such a child might systematically fail to make certain types of errors (errors such as **I am loving the book*). Thus, the only evidence of overly-fine categorization may be the systematic lack of errors, generalizations, or constructions where one would expect to find them.

1. Linguistic Evidence

The verb *be* appears in a number of different constructions.[1] Copula *be* appears as the sole verb preceding an adjectival phrase (AP), a prepositional phrase (PP), or a noun phrase (NP), whereas progressive *be* takes a progressive participle. If one can show that progressive *be* and copula *be* have distinct meanings, syntactic privileges, or inflectional paradigms, this suggests that they are distinct verbs which share homophonous forms.[2] If one cannot demonstrate any differences, this suggests there is a single verb *be* which can take a wide range of complements.

Morphological similarities. Copula *be* and progressive *be* share an identical, irregular inflectional paradigm. In the present tense, the first person singular form is *am*, the third person singular form is *is*, and the second person singular and the first, second and third person plural form is *are*. In the past tense, the first person and third person singular form is *was*, and the second person singular and the first, second and third person plural form is *were*. Additionally, for both types of *be*, the subjunctive form is *were*, the infinitival form is *be*, and the progressive form is *being*.[3] Similar morphological parallels exist for contracted forms of *be*. For both copula *be* and progressive *be*, the contracted form of *am* is *'m*, the contracted form of *is* is *'s*, and the contracted form of *are* is *'re*. For both copula *be* and progressive *be*, there is no contracted form for *was* or *were*. Copula *be* and progressive *be* have identical negated forms (e.g., *aren't*, *isn't*, *wasn't*, and *weren't*, but not **amn't*). Lastly, both progressive and copula *aren't* can precede, but not follow, the pronoun *I* (e.g., *aren't I winning/the winner?*, but not **I aren't winning/the winner*).

Semantic similarities. Sentences with copula *be* and progressive *be* have different aspectual meanings. Sentences with copula *be* typically connote states of being or properties (e.g., *by lunchtime, he was drunk*). Sentences with progressive *be* tend to connote ongoing events, processes or actions (e.g., *he was drinking himself to death*). However, these differences in meaning can be ascribed to differences in the meanings of the complements selected by *be*, and do not have to be ascribed to *be* itself. (For further discussion, see Carlson, 1983, and Jackendoff, 1976, 1983.)

Syntactic similarities. Both copula *be* and progressive *be* can invert, negate, and form tag-questions. If *be* is the first verb in a matrix question, a yes/no exclamative, or a negative polarity utterance, *be* must appear before the noun phrase regardless of whether *be* is copular or progressive (e.g., *was he drunk/drinking?*, *was he drunk/drinking!*, *not only was he drunk/drinking, he was rude*). All finite forms of copula *be* and progressive *be* can precede an uncontracted negation marker (e.g., *he was not drunk/drinking*).[4] Lastly, if *be* is the first verb in a declarative matrix clause, *be* is used in the formation of the tag question (e.g., *he was drunk/drinking, wasn't he?*).

In summary, the only clear way that copula *be* and progressive *be* differ is that copula *be* takes either an NP, AP, or PP and progressive *be* takes a progressive participle. If copula *be* is a distinct verb from progressive *be*, then copula *be* is the only verb in American English that inverts and negates but does not take a verbal complement. If copula *be* and progressive *be* are actually a single verb *be* (henceforth, *BE*), then *BE* is the only verb in English that inverts and negates that can select both verb complements and nonverb complements.[5] Do the semantic, syntactic, and morphological similarities between copula *be* and progressive *be* cause children to conclude there is only a single *BE*, or does the fact that copula *be* is the only inverting and negating verb in English that takes non-verb complements cause children to treat copula *be* as a distinct lexical item? In other words, does the overall structure of English affect children's acquisition of copula *be*?

2. Acquisitional Evidence

If copula *be* and progressive *be* have distinct patterns of acquisition and errors, this suggests that children treat them as distinct lexical items. Alternatively, if children acquire copula *be* and progressive *be* at the same age, in the same manner, and with similar types of errors, this is consistent with children's grammars containing a single verb *BE*. In a longitudinal study of three children, Brown (1973) found that all three children correctly used copula *be* in 90% of obligatory contexts before they correctly used progressive *be* in 90% of obligatory contexts. DeVilliers and deVilliers (1973) replicated this finding in a cross-sectional study of 21 children. Kuczaj (1985/86) found that the two children in his longitudinal study and some of the fourteen children in his cross-sectional study tended to first use and reliably use copula *be* before they first used or reliably used progressive *be*. In addition, Kuczaj reports that his son Ben sometimes placed copula *be*, but never progressive *be*, in sentence-final position. To the best of my knowledge, this is the only case reported in the the acquisitional literature of a child making different types of errors for progressive *be* and copula *be*.

Perhaps copula *be* and progressive *be* are one lexical item, but children reliably use copula *be* before they reliably use progressive *be* because copula *be* constructions are simpler than progressive *be* constructions. In order to use copula *be* in a grammatical sentence, children must utter a subject noun phrase followed by the appropriate *be* allomorph, followed by an NP, PP, or AP (e.g., *she was happy*). In order to use progressive *be* correctly in a sentence, they must utter a subject noun phrase followed by the appropriate *be* allomorph, followed by a lexical verb that has the progressive inflection *-ing* (e.g., *she was smiling*).

It is unlikely that the progressive inflection per se accounts for the late acquisition of progressive *be* because children acquire the progressive inflection before they acquire either copula *be* or progressive *be* (Brown, 1973; deVilliers and deVilliers, 1973). However, if children are limited in the number of morphemes they can utter, the presence of a progressive inflection might cause them to reach the 90% criterion for progressive *be* later than for copula *be*. Consider, for example, a child who can only utter sentences that have less than four morphemes. Such a child would be able to say copular sentences such as *she was happy*, yet be unable to say progressive sentences such as *she was smiling*. If a child with a productive capacity of three morphemes omits each morpheme in the progressive sentence equally often, she will omit progressive *be* 25% of the time. She might choose to omit progressive *be* more frequently than *she*, *smile*, or *-ing* because intuitively *be* has the least amount of semantic content of all of the morphemes.

If a length constraint accounts for the lateness of progressive *be*, then even though the acquisition of progressive *be* might be delayed relative to the acquisition of copula *be*, the pattern of acquisition of progressive *be* should be identical to the pattern observed for copula *be*. The relative order of acquisition of the *be* allomorphs and the types and rates of errors for the *be* allomorphs should be identical for progressive *be* and copula *be*.[6] The next five sections present analyses performed on the uses of copula *be* and progressive *be* in the spontaneous-speech transcripts of 12 children.

3. Study 1: First Use Analysis

The first analysis examined the age of acquisition and relative order of acquisition of progressive and copula *be* allomorphs in declarative, inverted, and negated constructions. Children were credited with acquisition of a *be* allomorph in a particular construction when they first uttered a clear example of that allomorph in that construction. Age of First Use was chosen as the age of acquisition for two reasons. First, previous research showed Age of First Use to be highly correlated with other measures of acquisition (Stromswold, 1989b).[7] Second, Age of First Use is the most sensitive measure of grammatical competence available from spontaneous-speech transcripts. As such, Age of First Use should be less affected by production constraints than measures of acquisition that require repeated, regular or reliable uses of a construction.

Method. All analyses were performed on the computerized CHILDES (MacWhinney and Snow, 1985; 1990) spontaneous-speech transcripts of the 12 children shown in Table 1. All children spoke American English as a first and only language.

Child	Corpus collected by	Ages	Uses of *be*
Abe	Kuczaj (1976)	2;5-5;0	3,806
Adam	Brown (1973)	2;3-5;2	3,734
April	Higginson (1985)	1;10-2;11	166
Eve	Brown (1973)	1;6-2;3	498
Mark	MacWhinney & Snow (1985)	1;5-6;0	1,940
Naomi	Sachs (1983)	1;2-4;9	1,021
Nathan	MacWhinney & Snow (1985)	2;6-3;9	696
Nina	Suppes (1973)	2;0-3;3	2,778
Peter	Bloom (1973)	1;10-3;2	2,298
Ross	MacWhinney & Snow (1985)	2;10-7;10	3,352
Sarah	Brown (1973)	2;3-5;1	2,349
Shem	Clark (1978)	2;3-3;2	1,161
TOTAL			23,799

Table 1: Transcripts Used in the *Be* Analyses

Age of First Use was determined in the following way. The UNIX utility "fgrep" culled all of the children's lines that contained the words *am*, *are*, *be*, *been*, *being*, *is*, *was*, and *were*. This yielded a corpus which contained 23,799 uses of *be*. For each child, the experimenter examined the transcript lines that contained *be* allomorphs and, for each *be* allomorph, recorded the first use of that progressive and copula *be* allomorph following a subject NP, preceding a subject NP, preceding a *not*, and preceding the contracted negation marker *-n't*. Utterances that had contracted, stuttered, or unclear uses of *be*, and utterances that were obviously routines or imitations were not counted. If it was impossible to tell whether a particular example of *be* was progressive or copular, the utterance was not counted. Lastly, in order for an utterance to count as the first use of a *be* allomorph preceding or following a subject NP (i.e., first use in inverted and declarative positions, respectively), the utterance in question had to contain a subject NP. First usages in negated contexts (*not* or *-n't*) were not required to contain a subject NP. An undergraduate research assistant did the same analyses on half of the transcripts. Concordance ratings were 95% or greater for all children, all verbs, and all constructions.

Results. A *t*-test performed on all of the data revealed that children acquired copula *be* an average of 2.2 months before they acquired progressive *be*, $t(11)$ =

3.01, $p = .012$.[8] A two-factor analysis of variance of the *are*, *is*, and *was* data revealed a significant main effect for the progressive/copula factor, $F(1, 11) = 15.39$, $p = .002$, a significant main effect for the allomorph factor, $F(2, 22) = 60.95$, $p < .0005$, and the significant interaction between these two factors depicted in Figure 1, $F(2, 22) = 5.99$, $p = .008$. Further analyses were not possible because of missing data (i.e., not all children used each copula and progressive allomorph in each context).

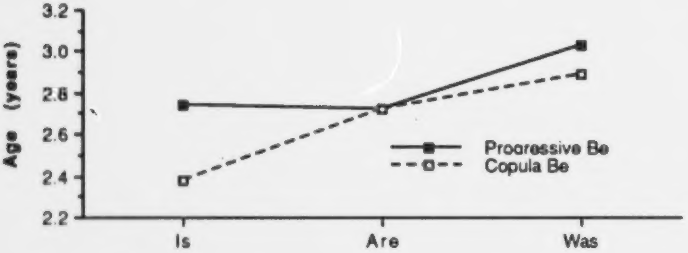

Figure 1: Progressive/Copula x Allomorph Interaction

4. Study 2: Inversion Analysis

Children's failure to place the auxiliary before the subject NP in questions is one of the most frequent and frequently-reported syntactic errors made by children acquiring English (c.f., Stromswold, 1990). The following analysis compared the inversion rate in matrix questions for copula *be* and progressive *be*. If copula *be* and progressive *be* are identical in children's grammars, then the inversion rate for copula *be* and progressive *be* should be the same.

Method. The fgrep utility searched the *be* corpora used in the First Use Analysis, culling all of the lines which contained either a question mark or a question word (*how*, *what*, *where*, *when*, *which*, *who* or *why*). The resulting lines were examined by hand and, for each copula and progressive *be* allomorph, the number of inverted and non-inverted questions was tallied. A question was included in the tally if it was a matrix questions with a clear subject noun phrase and either copula or progressive *be* as the first verbal element. Questions that contained a contracted, stuttered, or unclear form of *be* and questions that were obvious routines or imitations were not counted. If it was impossible to tell whether the *be* in a particular question was copular or progressive, the question was not counted. In addition, *how come* questions and tag question were not counted.

Results. Children inverted copula *be* less frequently than progressive *be*. Overall, 93.8% of the 811 scoreable progressive questions were inverted and 84.8% of the 2237 scoreable copula questions were inverted. All 12 children inverted progressive *be* more often than copula *be*, with a mean inversion rate of 90.9% for progressive *be* and 81.2% for copula *be*. This difference was significant, $t(11) = 5.21$ $p < .0005$. A two-factor analysis of variance of *are* and *is* questions revealed that progressive *be* was inverted significantly more often than copula *be*, $F(1, 11) = 58.39$, $p < .0005$, whereas there was no significant effect of allomorph, and no significant interaction between the two factors.

Ten children asked questions with both progressive and copular forms of *are*, *is*, and *was*. For these ten children, the mean inversion rate was 81.9% for progressive *be* and 75.5% for copula *be*, $F(1, 9) = 17.09$, $p = .003$. There was also a significant main effect of *be* allomorph, $F(2, 18) = 4.68$, $p = .023$, with an inversion rate of 63.3% for *was*, 85.2% for *are*, and 87.6% for *is*. There was a marginally significant interaction between the two factors, $F(2, 18) = 2.81$, $p = .087$. An analysis of variance with more levels of the allomorph factor could not be performed because only six children used both progressive and copula *am*, *are*, *is*, and *was*, and only three children used both progressive and copula *am*, *are*, *is*, *was*, and *were*.

5. Study 3: Unnecessary *do*-support

Do-support is required for negation or interrogation if a sentence lacks an auxiliary verb or *be* (e.g., *does she eat fish?* and not **eats she fish?*), and *do*-support is prohibited if the sentence contains an auxiliary verb or the verb *be* (e.g., *will they go?* and not **do they will go?*). The following analysis compared the rate of ungrammatical *do*-support for progressive *be*, copula *be* and the other auxiliaries. If children's grammars contain a single verb *BE*, the rate of unnecessary *do*-support should be the same for the both types of *be*.

Method. The fgrep utility was used to collect all of the lines that contained the words *do*, *don't*, *does*, *doesn't*, *did*, and *didn't* and put them into a new file. Fgrep was then used to search all of the lines in the *do*-file and to cull those lines that contained the words *am*, *are*, *be*, *been*, *can*, *could*, *had*, *has*, *have*, *is*, *may*, *might*, *must*, *shall*, *should*, *was*, *were*, *will*, *won't*, and *would*. The experimenter examined by hand all of the lines in the *do-AUX* file, searching for examples of unnecessary *do*-support.

Results. There were 23 examples of unnecessary *do*-support with auxiliaries or *be*. Three examples involved modal auxiliaries (Abe, 3;8, *you should have didn't go to school yesterday*; Mark, 4;1, *could you do untie the knot*; and Nina, 2;6, *I shall do pull it*). In one example, it was unclear whether the *be* was progressive, copular, or passive (Adam, 3;4, *why was I did break it?*).[9] Seventeen of the remaining 19 examples clearly had copula *be*, and two had either copula *be* with an AP or passive *be* (Ross, 4;4, *what else does the Phoenix is called?*; and Shem, 2;3, *where does these pictures be taken?*). Thus, none of the examples of unnecessary *do*-support involved progressive *be* and up to 20 of the 23 examples of unnecessary *do*-support may have involved copula *be*. Seventeen of the 23 examples had a tensed form of *do* followed by infinitival copula *be* (e.g., Adam, 3;5, *does it be around it?*; and Adam, 3;6, *this doesn't be straight*). Thus, seventeen of the 20 examples with copula *be* would have been correct if copula *be* were a lexical verb that required *do*-support. This was not the case for the examples with modals: In all three modal examples, the modal preceded *do*.

Perhaps the reason there were more examples of unnecessary *do*-support for copula *be* than progressive *be* is that the children used copula *be* more frequently in questions and contracted negatives. Overall, the children correctly used copula *be* in 1,897 inverted questions and 376 contracted negatives, for an unnecessary *do*-support rate of .83% for copula *be*. Overall, the children correctly used progressive *be* in 761 inverted questions and 98 contracted negatives, for an unnecessary *do*-support rate of 0.0% for progressive *be*. Six children invoked unnecessary *do*-support for copula *be* and no child invoked unnecessary *do*-support for progressive *be*. This difference was significant by sign-test, $p = .0312$. A *t*-test revealed that the average rate of unnecessary *do*-support for the twelve children was 0.7% for copula *be* and 0.0% for progressive *be*, $t(11) = 2.50, p = .030$.

6. Study 4: Strong Overregularization

Children occasionally overregularize inflections and say "eated" for *ate*, "foots" for *feet*, "haves" for *has*, etc. (c.f., Cazden, 1968; Brown, 1973; Pinker & Prince, 1988). Therefore, children should occasionally overregularize past tense and subject-verb agreement forms of *be* and create illicit forms such as *beed* for *was* or *were* and *bees* for *is*. Given that copula and progressive *be* have the same irregular forms (see section 1), if children's grammars contain a single verb *BE*, the rate of overregularization should be the same for copula and progressive *be*.

Method. The fgrep utility culled all of the lines of transcript which contained the letter strings: ams, am's, am-s, amed, am'd, am-d, am-ed, aming, am-ing, ares, are's, are-s, ared, are'd, are-d, areing, aring, are-ing, bees, bes, beez, be's, be'z, be-es, be-ez, be-z, beed, be'd, be-ed, ises, is-s, is's, ised, is-d, is-ed, is-ing, issing, ising, wases, was's, was-es, wased, was-ed, was-sing, wazzing, wassing, was-ing, weres, weres, were-ing, wering, wereing, wered, were-d, and were-ed. The experimenter examined all of the lines that contained these letter strings, searching for examples of overregularization.

Results. The transcripts contained five examples of *bes* for *is*, two cases of *beed* for *was*, one example of *ares* for *are*, and one example of *ams* for *am*.[10] All examples of overregularizing involved copula *be* and none involved progressive *be*. If, at the age that the children were overregularizing copula *be*, they hadn't yet begun to use progressive *be*, this would account for the lack of overregularized progressive *be*. However, this does not seem to be the explanation. In each case of overregularization, at the age when a child overregularized copula *be*, that child had already begun using the corresponding progressive *be* allomorphs correctly.

Perhaps the children overregularized copula *be* more often than progressive *be* because they used copula *be* more often, and hence there were more opportunities for overregularization. There were 3,352 correct uses of progressive *be* allomorphs and 12,229 correct uses of copula *be* allomorphs, for an overregularization rate of 0.0% for progressive *be* and .07% for copula *be*.[11] All twelve children correctly used progressive *be* allomorphs and copular *be* allomorphs at least once, six children overregularized copula *be* at least once, and no children overregularized progressive *be*. This difference was significant by sign test, $p = .0312$. A *t*-test revealed that the average overregularization rate for the twelve children was 0.07% for copula *be* and 0.0% for progressive *be*, $t(11) = 2.60, p = .025$.

7. Study 5: Weak Overregularization

In addition to obvious cases of overregularization in which an illicit verb form is created, another type of overregularization is possible with *be*. With the exception of *be*, the infinitival form of all verbs is homophonous to all present tense forms other than the third person singular form (e.g., *to eat, I eat, you eat, we eat, they eat*) In standard dialects of English, the allomorph *be* is never used to mark the present tense.[12] Thus, sentences such as *she could be sick* and *she could be dying* are acceptable, whereas sentences such as **she be sick* and **she be dying* are not. If children incorrectly use *be* for *am*, *are*, or *is*, this suggests they are overregularizing the behavior of *be* and treating it as if its inflectional paradigm were identical to the inflectional paradigm shared by every other verb in English. Thus, uses of *be* for *am*, *are*, and *is* provide weak evidence of overregularization. If children's grammars contain a single verb *BE*, then the rate of weak overregularization should be the same for copula and progressive *be*.

Method. The fgrep utility culled all of the lines which contained the string '<space>be<space>'. Fgrep then eliminated any lines in which *be* was directly preceded by a modal, a negated modal or the word *to*. The experimenter examined all of the resulting lines by hand, searching for examples of bare infinitival *be* in the present tense. If from context, an example appeared to lack a modal auxiliary or perfective *have* rather than to be a true example of weak overregularization, the example was excluded. Thus, examples such as *and den dey be looking for it* (Adam, 4;0) and *how long you be done?* (Abe, 2;11) were excluded.

Results. Of the 145 examples of weak overregularization, all but six involved copula *be*. The children incorrectly used copula *be* for copula *am*, *are*, or *is* 1.62% (139/8554) of the time. They incorrectly used progressive *be* for progressive *am*, *are*, or *is* 0.29% (6/2039) of the time. Of the eleven children who weakly overregularized *be* at least once, ten children had a higher overregularization rate for copula *be* than for progressive *be*. This differences was significant by sign-test, $p = .0118$. The average rate of weak overregularization for the 12 children was 2.80% for copula *be* and .83% for progressive *be*, $t(11) = 2.50$, $p = .142$. This difference was not significant because one child (Eve) weakly overregularized at almost twenty times the overall rate of overregularization for the other 11 children (19.8% versus 1.0%). As was the case with nine out of ten of the other children, Eve overregularized copula *be* more often than progressive *be*, chi-square(1)= 3.84, $p = .05$. However, Eve's rate of overregularization was so much higher than the other children that her data increased the variance and lowered the significance level of the *t*-test. When Eve's data were removed from the analysis, the rate of weak overregularization was significantly higher for copula *be* (1.03%) than progressive *be* (0.30%), $t(10) = 3.46$, $p = .006$.

8. Summary and Discussion of the Data

Morphologic, semantic, and syntactic tests indicate that the only way copula *be* and progressive *be* differ is in the complements they select. If children's grammars contain a single verb *BE*, the pattern of acquisition and errors should be the same for copula *be* and progressive *be*. The results of the five studies described above suggest that this is not the case. The first analysis revealed that the children in this study acquired copula *be* significantly before they acquired progressive *be*, corroborating earlier results of Brown (1973), deVilliers & deVilliers (1973), and Kuczaj (1985/86). The earlier acquisition of copula *be* could result from copula *be* and progressive *be* being distinct lexical items in the children's grammars, or it could result from a production constraint which causes progressive *be* to appear later because sentences with progressive *be* are longer and more complex than sentences with copula *be*.

If differences in length and complexity determine the order of acquisition of copula *be* and progressive *be*, then whereas the age of acquisition of progressive *be* and copula *be* may differ significantly, the pattern of acquisition should not differ for the two types of *be*. If copula *be* and progressive *be* are acquired at significantly different ages because they are distinct lexical items, then the order and pattern of acquisition for progressive *be* would not necessarily be the same as that observed for copula *be*. The significant interaction between progressive/copula and allomorph factors in the First Use analysis indicates that the pattern of acquisition differed for progressive *be* and copula *be*.

The single-*BE* hypothesis predicts that the error rates will be the same for copula *be* and progressive *be*. Different production constraints make different predictions about error rates. If children's production systems simply limit the length of their utterances, we would predict that, for each of the four types of errors examined in this paper, the error rate would be the same for copula *be* and progressive *be*. If children's production systems are such that children make more errors on longer and more complex constructions, error rates should be higher for progressive *be* than copula *be*. No straight-forward production constraint predicts a higher error rate for copula *be* than progressive *be*.[13]

The results of the error analyses argue against both a single-*BE* account and a production constraint account because for each of the four types of errors examined in this paper, the error rate was higher for copula *be* than progressive *be*. The inversion analysis revealed that the children failed to invert copula *be* more often than progressive *be*. This difference was significant by sign-and *t*-tests. Furthermore, the rate of inversion for copula *be* (84.8%) was lower than the inversion rates for modal auxiliaries (90.6%), auxiliary *do* (95.9%), and auxiliary *have* (96.3%). The unnecessary *do*-support analysis revealed that the children rarely invoked *do*-support when it was not needed. When they did, however, the question or negative utterance usually contained copula *be*. The children never invoked unnecessary *do*-support for a question or negative with progressive *be*. This difference was significant by both sign- and *t*-tests. The strong overregularization analysis showed that the children occasionally overregularized copula *be*, but they never overregularized progressive *be*. This difference was significant by sign- and *t*-tests. The fourth error analysis compared how frequently the children used *be* for *am*, *is*, and *are* (weak overregularization). The rate of weak overregularization was significantly higher for copula *be* than progressive *be* by both sign- and *t*-tests. Thus, the results of all five analyses indicate that children's grammars do not contain a single verb *BE* that can select either an NP, AP, PP or progressive participle.

9. Conclusion: The Acquisition & Reality of Grammatical Categories

If children make distinctions that are not made in their input language, this suggests that there is something about their innate endowment that leads them to do so. The fact that six-month old Japanese babies categorically distinguish between /l/ and /r/, even though the Japanese language does not, tells us something about the innate basis of categorical phoneme perception. Likewise, the fact that children acquiring English distinguish between copula *be* and progressive *be*, in ways that English does not, may tell us something about the innate basis of grammatical categories.

What kind of knowledge would enable a child to distinguish between copula *be* and progressive *be*? One possibility is that, just as children are innately endowed with the ability to perceive /l/ and /r/ categorically, children are born knowing that most, if not all, natural languages distinguish between auxiliary verbs and lexical verbs.[14] If children know this, then they might seek to categorize each verb they hear as being either a Lexical Verb (LV) or an Auxiliary Verb (AV). Among other things, the child might notice that AVs can invert and negate, whereas LVs cannot.

If children acquiring English categorize verbs simply based on negation and inversion properties, they should categorize both copula *be* and progressive *be* as AVs and make the same types of errors for both types of *be*. Thus, the results presented in this paper suggest inversion and negation are not the sole properties children use to categorize verbs.

If children notice that auxiliary verbs must select verb complements, whereas lexical verbs cannot, they will distinguish between copula *be* and progressive *be*, and categorize copula *be* as an LV and progressive *be* as an AV.[15] If children classify copula *be* as an LV, why do they ever invert and negate it? Why don't they always use *do*-support with copula *be*? Obviously, if copula *be* is a lexical verb, it is a very unusual lexical verb. If children usually remember that copula *be* is irregular (just as they usually remember that past tense of *eat* is *ate* not *eated*), they will usually invert and negate copula *be*. Occasionally, however, when they forget copula *be* is irregular, they will produce utterances such as *"who she is?," *"did I be good," *"this doesn't be straight," *"I beed very careful," and *"I be good". They will not produce these types of errors with progressive *be* because they have classified progressive *be* as an AV and not as an LV.

These results suggest that children do not merely learn the linguistic behavior of individual words in isolation, but rather that the structure of the language affects what they acquire. Children assign words to grammatical categories, and the categorical status of words affects their acquisition. That fact that children sometimes overgeneralize the syntactic behavior of members of these grammatical categories suggests that these categories are psychologically real to children (and, presumably, to adults), and not merely descriptive labels. To the best of my knowledge, the copula *be* errors described in this paper are the first reported errors in normal first language acquisition that result from children overgeneralizing at the categorical level. It is unclear how a system that does not instantiate grammatical categories could account for these results.

FOOTNOTES

[*] This work were supported by a National Science Foundation Graduate Fellowship, a Fairchild Graduate Fellowship, and a MacArthur Foundation Fellowship awarded to the author. I thank S. Carey, J. Grimshaw, R. Jackendoff, A. Marantz, D. Pesetsky, S. Pinker, and K. Wexler for helpful comments. I also thank Marie Coppola for her assistance with the first study. Portions of this work were presented at the 1989 Stanford Child Language Research Forum. Correspondence should be sent to Karin Stromswold, Dept. of Brain & Cognitive Sciences, E10-234, MIT, Cambridge MA 02139, or via e-mail to karin@psyche.mit.edu.

[1] The verb *be* also appears in passive constructions (e.g., *she was kissed by Bill*) and subject control constructions (e.g, *she*$_i$ *was PRO*$_i$ *to report to her commanding officer*). The acquisition of passive *be* and subject control *be* are not discussed in this paper because the children and adults rarely used these forms in the transcripts.

[2] The question is whether copula *be* and progressive *be* are different enough in modern English that they should be considered distinct lexical items, not whether they are historically related.

[3] Aspectual restrictions account for the somewhat marked nature of progressive *be* as a progressive participle. In general, the progressive participle is more felicitous for action verbs than for stative verbs. Thus, *she is reading the story* is substantially better than *she is knowing the story*. If *being* is defined as an active process and not merely a state (perhaps the action people

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perform at a "be-in"), the progressive participle form of progressive *be* is acceptable (e.g., *at the be-in, she really was being*).

[4] *Be* and *being* cannot precede *not* because neither *be* nor *being* is inflected for tense and, hence, neither can raise.

[5] Depending on the particular lexical verb, lexical verbs can select NPs, APs, PPs, and sentential complements. [Some verbs also appear to take verbal complements. For example, the verb *got* appears to be able to take a passive participle (e.g., *she got arrested*), a progressive participle (e.g., *it's time you got working on your thesis*), or, perhaps, a perfect participle (e.g., *she got started on the dishes*). The apparent passive participle may actually be an AP, the progressive participle may actually be a gerund, and *got started* may actually be a complex lexical verb and not *got* + perfect participle.] However, no lexical verb can invert, negate or form tag-questions. Auxiliary verbs can invert, negate and form tag-questions, but each auxiliary obligatorily selects a particular type of verbal complement.

[6] Valian (1991) argues that the reason children acquired progressive *be* after copula *be* is that sentences with progressive *be* have a more complex VP structure than sentences with copula *be*. Valiant's account makes the same acquisitional predictions as the length constraint account outlined above.

[7] Stromswold (1989b) determined when 12 children first used, repeatedly used, and regularly used each of five constructions. For the five constructions under investigation, all three measures were very highly correlated (all r's > .85, all p's < .01). See Stromswold (1989b, 1990) for a discussion of the merits of different measures of acquisition.

[8] All significance levels are for two-tailed tests.

[9] Given the morphology of the lexical verb, the redundant element probably is *was* and not *do*. It is unclear why the child would invoked *be*-support.

[10] One could argue that the transcripts actually contained 13 examples of strongly overregularized copula *be*. One example ("when she bes in kindergarten.") was not counted because it was said by a cousin of one of the subjects. Naomi said "he beed careful he looked both way" twice in a row and only the first example was counted. Immediately after saying "first Daddy bes first," Ross went on to say, "bes was a good word? who said bes is a good word?" For obvious reasons, these two examples were not counted. No child or adult ever used a potential example of overregularized progressive *be* in the transcripts.

[11] Marcus, et al. (forthcoming) report that this regularization rate is consistent with the overregularization rates they found for very high frequency irregular verbs.

[12] It is acceptable in some dialects of Black English. However, none of the children in the transcript study spoke these dialects.

[13] Of course, one could argue that the children devoted more attentional resources when they said more complex constructions and, thus, they produced fewer errors. Such an account is ad hoc, and requires that one make additional assumptions that aren't independently motivated.

[14] If Steele et al. (1981) is right and all languages have auxiliary verbs, it is plausible that the AUX/lexical verb distinction is part of Universal Grammar and, thus, part of children's genetic endowment. Alternatively, children might be born knowing that languages have formal categories, that some categories have closed membership and others have open membership, and that languages often have closed-class categories that correspond to the open-class categories.

[15] Alternatively, children might categorize a verb as an auxiliary verb or a lexical verb depending on whether the verb can appear as the sole verb in a sentence or whether the verb can assign a theta-role.

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ESCOL '91 347-358

CONSTITUENT STRUCTURE PROCESSING IN KOREAN*

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0. Introduction

So-called "super pro-drop" languages such as Korean raise serious parsing questions especially when we apply a model of human sentence processing developed on the basis of English. The following Korean sentence is a typical example showing the problem of indetermination.

(1) Jay-ka Mary-lul coahanta-ko malhaessta [1]
-NOM -ACC like-COMP said

Unless there is a prominent NP acting as a discourse topic, the subject of the matrix predicate and that of the embedded predicate in (1) should be coreferent; i.e., the interpretation for (1) is 'Jay said that he(himself) likes Mary.' It has been a common analysis of (1) to consider that it has a structure like (1a).

(1a) Jay$_1$-ka [e$_1$ Mary-lul coahanta-ko] malhaessta

In this paper, I argue that regarding (1a) as the structure of (1) poses serious problems from the parsing perspective, and thus an alternative structure like (1b) should be considered as the structure of (1).

(1b) e$_1$ [Jay$_1$-ka Mary-lul coahanta-ko] malhaessta

After discussing parsing issues related to (1), I'll argue that positing (1b) is also reasonable from the syntactic viewpoint.

1. The Problem with Traditional Analyses

The problem with (1a) from the parsing perspective is that the parser cannot build a structure until it sees the matrix verb, which is the last word of the sentence. Let us consider the problem in detail: When Jay-ka and Mary-lul are encountered, the parser may consider that they belong to the same clause. The argument structure of the next word, coahanta-ko, is consistent with such a consideration. However, the fact that coahanta-ko contains a complementizer implies that the lexical items encountered thus far may not make up a clause, as shown in the structure like (1a). Note that those lexical items could constitute a clause in a case where the whole embedded clause has been preposed. At this point, the parser cannot determine the structure until it sees the next word. When malhaessta is encountered, the parser realizes that the previous lexical items do not constitute a clause. So, at that point, Jay-ka should be placed in the matrix subject position and an empty category (EC) should be inserted in the embedded subject position.

Such a problem from the parsing perspective becomes more serious when we consider sentences involving degree 2 embedding or more such as (2).

(2) Jay-ka Mary-lul haekohanta-ko kanpwutul-eykey palphyohaessta-ko malhaessta
-NOM -ACC fire -COMP staff -to announced -COMP said
'Jay$_1$ said that he$_1$ announced to his staff that he$_1$ would fire Mary.'

(2a) Jay$_1$-ka [e$_1$ [e$_1$ Mary-lul haekohanta-ko] kanpwutul-eykey

palphyohaessta-ko] malhaessta

Provided that (2a) is the structure for the string (2), the parser just can't determine which clause Jay-ka belongs to or how many ECs should be posited up to the point of seeing the verb palphyohaessta-ko. Only when the matrix verb is encountered, the parser can determine the status of Jay-ka as a matrix subject and the number of ECs posited in (2a).

There seem to be two ways to maintain that (1a) and (2a) are the structures the parser builds for the string (1) and (2), respectively: One is to assume that the parser has a lookahead device which is unlimited; that is, it can refer to the rightward context up to an arbitrarily far point. The other is to assume a reanalysis procedure in which the parser initially considers Jay-ka, Mary-lul, and coahanta-ko in (1) to belong to the same clause, and later revises that consideration, resulting in (1a).

It seems that the first option is not acceptable. In fact, no parsing model adopts an unlimited lookahead device. The second option, assuming a reanalysis procedure, appears unlikely because (1) and (2) do not display any indication of a garden path sentence.

2. The Alternative Structure

It seems that we can escape from the above dilemma by assuming that (1) and (2) have the following structures, (1b) and (2b), respectively.

(1b) e$_1$ [Jay$_1$-ka Mary-lul coahanta-ko] malhaessta

(2b) e$_1$ [e$_1$ [Jay$_1$-ka Mary-lul haekohanta-ko] kanpwutul-eykey

palphyohaessta-ko] malhaessta

The immediate advantage with adopting (1b)/(2b) is that the parser does not have to wait until it sees the matrix verb; it can incorporate each word into a present constituent structure as soon as it is encountered. Moreover, no reanalysis procedure is necessary in building a structure like (1b); the parser builds up the embedded clause first, and structures the matrix clause next by positing an EC in the matrix subject position when the main verb is encountered. Such an order of structure building seems to be inevitable from the head final property of this language. Even when the matrix subject is overt as in (3), the matrix clause is built after the embedded clause is done, since the matrix verb always appears in the sentence-final position.

(3) Ray-ka [Jay-ka Mary-lul coahanta-ko] malhaessta
-NOM -NOM -ACC like -COMP said
'Ray said that Jay likes Mary.'

Proposing (1b) is also desirable in the respect that it is consistent with the Left-to-Right Constraint (LTRC) of Frazier & Rayner (1988), which seems to be necessary to any type of parser to guarantee parsing efficiency.

(4) Left-to-Right Constraint:- The processor should incorporate each item into a present constituent structure as soon as it is encountered.

One thing we should note here is that, since Korean is head-final, processing may not proceed in the same way as in head-initial languages like English. That is, complete structure building might be done at the end of the clause, since crucial informations such as Argument structure or Theta-role, which are carried by the verb, are available only at the end of the clause. However, this does not mean that the parser does not do anything prior to the appearance of the verb. For instance, as Hasegawa(1990) and Inoue(1991) point out, in Japanese (and Korean), Case particles attached to NPs appear to suggest what will be the possible structure (even) in the absence of the verb. Overall, structure building in Korean seems to be done in accordance with the following strategy.

(5) The parser builds the minimal grammatical structure as lexical items are encountered.

More arguments for proposing (1b) are in order. The first argument comes from sentences involving an EC bound by a discourse topic. Logically, it is possible that in an appropriate context containing a discourse topic, (1) is interpreted as (1a') or (1b') in the following.

(1) Jay-ka Mary-lul coahanta-ko malhaessta
-NOM -ACC like-COMP said

(1a') Jay$_2$-ka [e$_1$ Mary-lul coahanta-ko] malhaessta

(1b') e$_1$ [Jay$_2$-ka Mary-lul coahanta-ko] malhaessta

The EC in (1a') and (1b') is construed to the discourse topic, not to *Jay*. What is of importance here is that even though there is a prominent NP acting as a discourse topic, it is very difficult to interpret the string (1) as (1a'), unless a long pause is put after *Jay-ka*. (Some informants hardly got the reading of (1a') even with a long pause after *Jay-ka*.) On the other hand, given a discourse topic, (1) is naturally interpreted as (1b') without any prosodic information. Such a contrast suggests that the parser usually builds a structure like (1b)/(1b') from the string (1). Obviously, a structure like (1a') is a marked case; that is, only when a special cue such as prosodic information is provided, the parser builds a structure like (1a)/(1a') from (1).

Another argument for proposing (1b) comes from a sentence involving *yeychukhata* (to expect). Consider the following.

(6) Fred-ka Bill-ul pati-ey chotaeha-lke -la -ko yeychukhaessta
-NOM -ACC party-to invite -fut-DEC-COMP expected

(7a) Fred$_1$-ka [e_2 Bill-ul pati-ey chotaehalkela-ko] yechukhaessta
'Fred expected that someone would invite Bill to the party.'

(7b) e_2 [Fred$_1$-ka Bill-ul pati-ey chotaehalkela-ko] yechukhaessta
'Someone expected that Fred would invite Bill to the party.'

The verb *yeychukhata* (to expect) is peculiar in the respect that when it is used as a matrix verb as in (6), the referent of the matrix subject and that of the embedded subject are disjoint. Thus, we get two different interpretations, (7a) and (7b), from the string (6). What should be noted here is that (7b) is the preferred (or most immediately available) interpretation between the two. This means that the parser does not delay structuring the items, but groups them immediately into a clause. There is an apparent parallelism between (7b) and (1b); the parser builds a structure consistent with (4) and (5).

3. Syntactic Arguments for Positing (1b)

In the following, I will show that positing a phrase structure analogous to (1b) is sometimes necessary from the syntactic viewpoint, and representations like (1b) are legitimate. A potential problem with (1b) is that Binding Condition C in Chomsky(1981) is violated. However, particular syntactic conditions of the Korean grammar lead us to conclude that (1b) is not a Condition C violation. Before discussing the issue of Binding Conditions, let us consider Korean data involving reflexive *caki*(self).

3.1. Binding of the Reflexive and the EC

(8) A: Fred$_i$-ka ecey eti kassess-ni
-NOM yesterday where went -Q
'Where did Fred go yesterday ?'

B1: e$_i$ New York-ey kassess-e
-to went-DEC
'He went to New York.'

B2: *caki$_i$ -ka/-nun New York-ey kassess-e
self-NOM/-TOP -to went-DEC
'He went to New York.'

(8) is a part of a conversation containing reflexive caki. B can answer A's question by using an EC(or ku(he) or Fred) as a subject of the sentence. But, as shown in B2, it is not possible to use a reflexive as a subject. Such a contrast suggests that caki must be bound by its antecedent within a sentence while an EC may be bound by its antecedent from outside of the sentence. [2] Based on this observation, let us consider the following data.

(9) A:Fred$_i$-ka ecey muelako malhaess-ni
-NOM yesterday what said -Q
'What did Fred say yesterday ?'

B:caki$_i$-ka Bill-ul top-keyss -ta -ko malhaess-e
self-NOM -ACC help-will-DEC-COMP said-DEC
'He said that he(himself) would help Bill.'

(10) caki$_i$-ka [e$_i$ Bill-ul top-keyss-ta-ko] malhaess-e

(11) e$_i$ [caki$_i$-ka Bill-ul top-keyss-ta-ko] malhaess-e

There are two finite verbs and one nominative NP (caki-ka) in B's answer. Now, the question is, between (10) and (11), what is the correct structure for (9B). From the characteristics of caki and the EC observed in (8), it follows that only (11) can be the structure for (9B). Note that (11) is analogous to (1b) in the previous section. It seems that positing an EC in the matrix subject position is not a surprising but a reasonable proposal from the syntactic viewpoint. One thing should be clarified, however; what is the nature of the EC in (1b) and (11) ?

3.2. The Nature of the EC and Principle C

Let us turn to the issue of the Binding Condition. A potential problem with (1b) is that Principle C is violated; a name is bound by an EC in (1b).

(1b) e_1 [Jay$_1$-ka Mary-lul coahanta-ko] malhaessta
-NOM -ACC like COMP said

I will argue that (1b) is not a Principle C violation, based on the following data.

(12) Jay-ka Jay-ul piphanhaessta
-NOM -ACC criticized
'Jay$_1$ criticized Jay$_1$.'

(13) Mary-ka [Jay-ka Mary-lul piphanhaessta-ko] haessta
-NOM -NOM -ACC criticized-COMP said
'Mary$_1$ said that Jay criticized Mary$_1$.'

In (12) and (13), a name is coindexed and c-commanded by another name, yet the sentences are grammatical. In both examples, the coreference reading is strongly preferred. As Lasnik & Uriagereka (1988) and Lasnik (1991) point out, such a violation of Principle C is also observed in other Asian languages. It should be noted, however, that there are some cases where Principle C must be obeyed in such languages. Consider the following examples.

(12') *ku$_1$ -ka Jay$_1$-ul piphanhaessta
he-NOM -ACC criticized
'He$_1$ criticized Jay$_1$.'

(13') *kunye$_1$-ka [Jay-ka Mary$_1$-lul piphanhaessta -ko] haessta
she -NOM -NOM -ACC criticized -COMP said
'She$_1$ said that Jay criticized Mary$_1$.'

The contrast between (12)/(13) and (12')/(13') suggests that there is still a restriction on the distribution of names in Korean; that is, a name cannot be bound by a pronoun. Interestingly, Lasnik(1991) proposes that Principle C should be relaxed in order to handle the phenomena such as the above. He proposes the following as a replacement of Principle C.

(14) A less referential expression may not bind a more referential one.

From (14), it follows that an R-expression is pronoun-free, provided that a pronoun is less referential than an R-expression. Let's assume that (14) is the core Binding principle and the difference between English and Korean observed in (12) &(13) is the result of parameterization of this principle. Then, we can say that if the EC in

(1b) is classified not as a pronominal/anaphor but as an R-expression, (1b) may be regarded as a legitimate representation, since the relation between the EC and Jay in (1b) does not violate (14).

It seems clear that the EC in question is not anaphoric; it may not be bound by anything within the sentence, as shown in (8) or (9). Now, we have two possibilities; the EC is either pronominal or R-expression. It seems to be an open question whether Korean has an empty pronoun (pro) or not. However, regardless of this question, we should admit the existence of non-pronominal & non-anaphoric ECs from the instances like (15).

(15) cenpan -ey e_1 sip cem-ul apsess-ko hwupan-ey -to
1st half-in ten points led-and 2nd half-in-too

Redskins$_1$-ka aptohaessta
-NOM dominated

'Redskins led by ten points in the first half, and they dominated in the second half, too.'

(15) contains a coordinate conjunction ko(and). The EC in (15), which occurs in the first clause, cannot be considered as a pronominal; if we replace the EC with an overt pronoun, the sentence becomes ungrammatical with the intended meaning. [3] Given this, it can be said that the nature of this EC is R-expression, i.e., an empty name, and the same kind of EC occurs in the matrix subject position in (1b). [4]

Interestingly, Munn(1989) proposed that in a coordinate structure, the two XPs are in a relation in which the first XP c-commands the second. If this proposal is correct, then (15) is evidence that in Korean, an EC can appear in the highest position in the S, from which it can bind an overt name. Hence, it follows that (1b) is a legitimate representation.

Summarizing, in Korean, the name-like EC in (1b) may lead to the legitimate violation of the conventional principle C, as overt names do. Therefore, (1b) is a grammatical representation in the same way as the following. [5]

(1') Jay$_1$-ka [Jay$_1$-ka Mary-lul coahanta-ko] malhaessta
-NOM -NOM -ACC like -COMP said
'Jay said that he likes Mary.'

4. The Processing of Topic-marked NPs

In this section, we'll discuss another parsing issue. Thus far, we have observed the cases where the parser builds the minimal structure in accordance with (4). But, a sentence involving a topic(TOP) NP exhibits different properties. In fact, if we replace a nominative (NOM) NP with a TOP NP in the previous examples, we get quite different results. For example, the preference between (7a) and (7b) becomes the opposite if we use Fred-nun(TOP) instead of Fred-ka(NOM) in (6). The following sentence also shows us a clear contrast between using a NOM NP and a TOP NP.

(16)	$[e_1$ [Jay-ka/-nun	naenyeney	ku	cip -ul	maeiphalkela
	-NOM/-TOP	next year	that	house-ACC	will buy

-ko]	malha-n]	$salam_1$-ka	Mary-lul	pangmwunhaessta
-COMP	said-REL	man-NOM	-ACC	visited

'The man who said that Jay would buy that house next year visited Mary.'

(16) does not display any indication of a garden path sentence if Jay-ka starts the sentence. However, if it is replaced by Jay-nun, the sentence becomes very difficult to understand at first glance, even though it is still grammatical. Such a sharp contrast between the two cases implies that a totally different strategy from (4)/(5) is employed in the processing of a TOP NP. The intuition of native speakers suggests that the parser judges the TOP NP to belong to the topmost clause and tends to leave it unattached until the matrix verb is encountered. Such a tendency reflects an important syntactic characteristic of TOP NP: It occurs only in a root clause. [6]

The fact that some special strategy is employed when a TOP NP is encountered implies that Korean is different from English-type languages with regard to the markedness of embedded clause or matrix clause. [7] That is, in English, the parser's assumption is that the first clause is the main clause unless it is marked with the Complementizer that etc., as seen in the following.

(17) Mary met Bill's brother.

(18) That Mary met Bill's brother is surprising.

On the other hand, in the processing of Korean, the parser does not consider that an NP belongs to the main clause unless it is marked with a TOP marker etc. Such a contrast between the two languages may be derivable from the different ways of structure building; in Korean, what is initially built is the embedded clause, whereas, unless marked, it is usually not the case in English.

It is worth noting that the status of TOP NP is similar to that of the first NOM NP in a center-embedded sentence such as (3) in the respect that both are left unattached in the phrase structure tree until the matrix verb is encountered. The fact that sentences involving a TOP NP and center-embedded sentences (up to degree 2 embedding) are not difficult to parse suggests that it is not so burdensome to the parser to hold one or two NPs unattached during on-line processing, unless the NP is very long or complex. Note that this is inevitable especially in the processing of center-embedded sentences due to the fact that the embedded clause should be built prior to the matrix clause.

5. Conclusion

In this paper, I argued that constituent structure processing in Korean is not so different from that in head-initial languages in the respect that LTRC is also operative in it. It has been proposed to posit a phrase structure in which an EC occurs in the matrix subject position when the embedded subject and the matrix subject are coreferent. Assuming such a phrase structure seems to be reasonable from the syntactic viewpoint as well as from the parsing perspective. A different parsing strategy from LTRC or (5) is employed when a TOP NP is encountered; the parser leaves it unattached until the matrix verb appears. This strategy and the notion of minimal structure building represented by (5) seem to be the core idea in the processing of Korean.

FOOTNOTES

* Special thanks go to Paul Gorrell, for focusing my attention on this topic, for the invaluable discussions I had with him, and for the helpful comments on this paper. I also thank David Lebeaux, Amy Weinberg, Alan Munn, and Cristina Schmitt for their comments and suggestions. Flaws and imperfections in this paper are solely mine.

1. In transliterating Korean examples into Roman alphabet, we follow the Yale Romanization system, which is a direct Romanization from the Korean spelling system to the English alphabet system; the Yale system does not necessarily reflect correct pronunciation.

The following abbreviations are used in the glosses:
'NOM'=nominative Case marker, 'ACC'=accusative Case marker
'TOP'=topic marker, 'GEN'=genitive Case marker, 'COMP'=complementizer,
'REL'=relative marker, 'DEC'=declarative marker, 'Q'=question marker.
(Irrelevant morphological details are not specified.)

2. Yang(1986), among others, observes that there are cases where caki is bound by its antecedent from outside of the sentence. The following conversation is such an instance given by him.

A: chelswu$_1$-ka kukos-ey salam-ul ponayss-ni
-NOM there man-ACC sent -Q
'Did chelswu send somebody to that place ?'

B: ani, caki$_1$-ka cikcep kass-e
no, self-NOM in person went-DEC
'No, he himself went (to that place).'

Although caki is not bound within a sentence in (B), it seems that such a usage of caki is very restricted and thus it is not an argument against my observation. As seen from the translation of (A) and (B), caki conveys a contrastive meaning in this case, and it is only in such a case that caki is allowed to be bound from outside of the sentence. It seems that there are two types of caki, pure reflexive and contrastive (or emphatic) pronominal, and the latter may violate Principle A.

3. Montalbetti(1984) observes that overt pronouns and empty pronouns are in contrastive distribution in some languages. His observation implies that we cannot exclude the possibility that the EC in (15) is an empty pronominal despite the fact that employing an overt pronoun instead of the EC makes (15) ungrammatical, since overt and empty pronouns may be in contrastive distribution. However, as his Overt Pronoun Constraint suggests, the contrastive distribution between overt and empty pronouns is observed when the antecedent of them is a formal variable, i.e., WH and QR traces. It seems to be the case that, at least in Korean, empty pronouns and overt pronouns are not in a contrastive distribution when their antecedent is a name. Therefore, the EC in (15), which behaves differently from the overt pronoun, can't be classified as a pronoun.

4. It seems that the EC here is bound by an empty operator and its value is uniquely determined. (Cristina Schmitt (p.c.)) It is construed to the most prominent NP in the sentence. So, there is only one way to interpret the EC, as shown in the following.

(i) John-ui hyeng-ui chinkwu-ka Mary-lul coahanta-ko malhaessta
-GEN brother-GEN friend-NOM -ACC like-COMP said
'John's brother's friend$_1$ said that he$_1$ likes Mary.'

Here, the EC in the matrix subject position can be construed to neither John nor John's brother; it should be coreferential with John's brother's friend. This is contrasted with the fact that a pronoun can be construed to any NP in the sentence unless Principle B or C is violated.

5. Some questions concerning the syntactic nature of the name-like EC(NEC) may be raised: First, does NEC belong to the same category as Wh-trace ? If it does, then conventional principle C will be legitimately violated in sentences involving Wh-trace. However, the ungrammatical status of the following sentence suggests that it is not the case; that is, strong crossover effect is observed in Korean.

(ii) *Jay$_1$-ka nwukwu$_1$-lul piphanhaess-ni
-NOM who -ACC criticized-Q
'Who$_1$ did Jay$_1$ criticize ?'

Thus, the answer for the above question seems to be negative. I argue that NEC is different from Wh-trace in the sense that only the former, being an R-expression, is constrained by Principle C. Note that, as Paul Gorrell (p.c.) pointed out, under the framework like Generalized Binding of Aoun (1985, 1986), Wh-trace will be systematically differentiated from NEC; the former is an A'-anaphor, whereas the latter is not. Also note that, as pointed out by Higginbotham(1983), among others, it is counter-intuitive to assume that Wh-trace is an R-expression since it (or its antecedent) does not have any referentiality. Provided that Wh-trace doesn't belong to R-expression, there is no reason to expect a parallelism between NEC and Wh-trace in terms of applying Condition C. Presumably, strong crossover phenomenon could be accounted for by some principle other than Condition C.

The second question is what is the LF representation of sentences like (1) if the subject NP is not a proper name, but a Wh-phrase(WHP) or quantifier phrase(QP). If in such a case, the parser builds a structure in the same way as in (1b), it becomes very difficult to account for the scope assignment of a QP or WHP. Note that, however, native speakers' intuition suggests that a QP/ WHP be processed in the same way as a topic NP rather than a nominative NP. (Refer to section 4 for the strategy for the processing of a topic NP.) One syntactic phenomenon relevant here is that Korean QPs like enu namca-na (some man-na = every man) are formed by adding a particle na, which conveys 'universal' force, to the indefinite NP, and such QPs are incompatible with a NOM/ACC marker as well as a TOP marker. Given this, the question is, which strategy the parser employs when such QPs are encountered. The answer seems to be that the parser considers them as a focused element and employs the strategy for the processing of a topic NP.

The third question is why the following sentence containing NEC is not grammatical.

(iii) *e_1 Jay$_1$-lul piphanhaessta
-ACC criticized
'Jay$_1$ criticized Jay$_1$.'

At this point, I do not have any syntactic explanation for this. It might be the case that since it is pragmatically odd to criticize oneself, (iii) only means that 'someone criticized Jay.'

6. A TOP NP may occur in the embedded clause led by a quotative complementizer ko. However, this is rather expectable since a quotative complement generally behaves like a root clause.

7. Paul Gorrell (p.c.) pointed out this to me.

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ESCOL '91 359-370

GOVERNED PRO AND FINITENESS

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This paper focuses on a number of properties of the null subjects of subjunctive complement sentences in Modern Greek. I intend to show that the subjects in question combine the set of properties associated with the empty category PRO despite the fact that the structures involved are finite.[1] I will then demonstrate that the claim that PRO is present in Greek can explain the incompatibility of the subjunctive marker with overt complementizers and the absence of subject obviation effects from structures involving volitional matrix predicates. Finally, I will propose a redefinition of the licensing conditions for PRO which will accommodate the data presented and, at the same time, exclude the appearance of PRO in subject position of finite predicates in languages like those of the Romance or Germanic group.

Even at first glance Greek subjunctives seem to differ significantly from what are considered subjunctive clauses in a group of relatively related languages, the Romance languages. Subjunctive sentences in Greek are introduced by a particle that has been considered to be an INFL element and not a complementizer (Phillipaki 1987, Rivero 1988). Furthermore, the inflected lexical verb that follows the subjunctive particle is indistinguishable morphologically from the lexical verb that appears in the indicative mood. Put differently, subjunctives in Greek do not involve specific inflectional morphology realized on the lexical verb. The only element that distinguishes the structures morphologically is the INFL particle. These facts are exemplified in (1) and (2) the first of which employs a subjunctive sentential complement and the second an indicative:

(1) I Maria prospathi **na** diavazi poli
Mary tries PRT reads a lot
'Mary tries to read a lot'

(2) O kathigitis ipe oti i Maria diavazi
the professor said that Mary reads
'the professor said that Mary reads'

1. Subject and Object Control Predicates

With this much in mind, let us consider in the beginning the subject control predicates in (3)-(8).

(3) I Maria$_i$ prospathi $e_{i/*j}$ na diavasi
Mary tries PRT reads
'Mary tries to read'

(4) I $Maria_i$ prospathi $e_{i/*j}$ na grapsi ena piima
Mary tries PRT writes one poem
'Mary tries to write a poem'

(5) * I Maria prospathi na diavasoun
Mary tries PRT they-read
'Mary tries them to read'

(6) * I Maria prospathi na grapsoun ena piima
Mary tries PRT they-write one poem
'Mary tries them to write a poem'

(7) ?* I Maria prospathi na diavasoun ta pedia
Mary tries PRT they-read the children
'Mary tries the children to read'

(8) ?* I Maria prospathi na grapsoun ta pedia ena piima
Mary tries PRT they-write the children a poem

It is obvious that there are two distinct subject theta roles involved in the above structures, each one assigned by each of the predicates. However, it is also obvious from (3) and (5) that there is coreference imposed on the two subjects. What is additionally shown by (5) is that a null pronominal subject cannot be licensed in the embedded clause, despite the fact that a finite verb is involved and Greek is a null subject language.

A lexical subject in the embedded sentence is only marginally possible, and only in postverbal position as seen in (7). Notice that an overt subject is also marginally possible in English constructions that otherwise involve a PRO subject, such as in: 'John tries for Mary to win'. This, however, does not imply that the status of the embedded subject in 'John tries to win' is in any way different.

Therefore, following standard assumptions that consider PRO to combine the properties of requiring coreference with another argument and not be able to alternate with a lexical NP, based on other considerations that will follow, I consider the embedded subject in sentences as (3) and (4) to be PRO.

Similar observations can be made by examining the facts in (9)-(12). The reference of the empty embedded subject in these sentences is fixed by grammar and it can only refer to the matrix object. Again, the position it occupies cannot be alternatively occupied by a lexical NP. Therefore, I will conclude that the null subject of the embedded sentences in (9) and (12) is also PRO.

(9) I Maria parakalese to $Yianni_i$ $e_{i/*j}$ na diavasi
Mary asked John-ACC PRT reads

(10) * I Maria parakalese ton Yianni na diavaso
Mary asked John-ACC PRT I-read
'Mary asked John that I read'

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(11) ?* I Maria parakalese to Yianni na diavasoun ta pedia
Mary asked John-ACC PRT they-read the children-NOM
'Mary asked John for the children to read'

(12) I Maria parakalese ta pedia$_i$ $e_{i/*j}$ na diavasoun
Mary asked the children-ACC PRT they-read
'Mary asked the children to read'

By postulating a PRO subject as the null argument of the sentences in (3), (4), (9) and (12) one can immediately explain the referential dependency of this argument and at the same time provide an account of why an overt complementizer is not possible in this type of structures.

It follows, in other words, that sentences like (3) and (9) involve the representation in (13).

(13). ...... V (NP) $[_{CP}$ [PRO PRT V

Consequently, the reason why an overt complementizer is impossible in (13), as seen from the ungrammaticality of (14), can be attributed to the fact that a lexically filled C^0 governs PRO which is located in Spec(MP) - Mood Phrase - and induces a PRO Theorem violation.

(14) * I Maria prospathi oti na diavasi
Mary tries that PRT reads

An interesting contrast is exhibited by the subjunctive complements to verbs that select for an embedded wh-clause, since, contrary to lexical complementizers that govern the subject of their complement MP, wh-phrases do not. Therefore, while the presence of the former induces a PRO Theorem violation and results in the ungrammatical sentence (15b), the latter does not.

(15) a. Den ksero pou na fao
not I-know where PRT I-eat
'I don't know where to eat'

(15) b. * Den ksero an na fao
not I-know if PRT I-eat
'I don't know if to eat'

Notice that identical contrast holds for English infinitival constructions - the glosses of (15a) and (15b) - for similar reasons, as pointed out in Kayne (1991). A sentence like (15b), however, can be saved in English if 'if' is replaced by 'whether', which carries the same meaning, but as a wh-phrase occupies the Spec(CP) position rather than the head position and does not induce a PRO Theorem violation. This possibility is not available in

Greek, nor is it in a large number of other languages.

2. Volitional Predicates

Consider now complements to volitional predicates, as in (16).

(16) O Yiannis$_i$ theli $e_{i/j}$ na diavasi
John wants PRT reads
'John wants (him/her) to read'

I will argue, contrary to (Phillipaki 1987) and (Rivero 1987), that subjunctive complement clauses to volitional predicates also involve the presence of a PRO subject in Greek. However, here the situation is more complicated, and the facts less obvious. In other words, it is not at all clear that in a sentence like (16) the null embedded subject is obligatorily coreferent to a matrix argument. It rather seems to behave like a null pronominal, the reference of which is not fixed by grammar.

There are, however, reasons to believe that this view is not entirely correct and that the embedded clause in (16) does not display behavior typical of subjunctive structures, complements of volitional verbs in other languages. In addition, the empty subject of the above complement clauses also displays behavior different from that of other null subjects in Greek. But let me begin with the first observation.

There is, in all Romance languages (except for Rumanian) a very well known fact concerning the pronominal subjects of complement clauses to volitional predicates. This is the phenomenon of subject obviation, and is exemplified by the indices of the example in (17) from Spanish:

(17) Juan$_i$ quiere que $e_{j/*i}$ coma
Juan wants that eats-SUB
'Juan wants him to eat'

This phenomenon has been widely discussed in the literature (Picallo 1985, Raposo and Meireles 1984, Rizzi 1989) and one prominent account attributes subject obviation to the strict tense dependencies that subjunctive subordinates manifest. These dependencies render the subjunctive tense anaphoric, and require that it be bound by a non-anaphoric tense. This requirement causes the governing category of the embedded pronoun to extend to the matrix clause, and the pronoun to be free within it.

Similar tense dependencies hold in Greek as well, as seen from the paradigm in (18) where the sequence present-past is grammatical if the complement clause is indicative, as seen in (18a), but ungrammatical when the complement sentence is subjunctive as in (18b).

(18) a. O Yiannis kseri/legi oti meno/emena mazi sou
'John knows/says that I-live/I-lived with you'

(18) b.   O Yiannis theli   na   meno/*emena mazi   sou
          John   wants   PRT I-live/I-lived with you'

Nevertheless, the Tense dependencies of the complement clause do not give rise to obviation, as already shown from the indices in (16). This is the first fact that has to be explained when one examines volitional complementation in Greek, and the rest of the Balkan languages.

Let us now turn to the second aspect, which renders subjunctive subjects distinct from other subjects in Greek. This has to do with the word order facts exemplified in (19). It is seen from (19a) that an overt subject results in a marked reading when it appears in pre-PRT position. The natural reading for the sentence is obtained when the subject immediately follows the verb, as in (19b).

(19) a. ?? O Yiannis theli i Maria   na diavasi to gramma
          John   wants Mary-NOM PRT reads   the letter

(19) b.   O Yiannis theli na diavasi i Maria to gramma
          John   wants PRT reads   Mary   the letter
          'John wants Mary to read the letter'

These word order facts - which contrast the word order possibilities of other complement clauses - are more pronounced in the rest of the Balkan languages, and are exemplified in the following sentences from Albanian.

(20) a. * Maria do   Jani të   hajë
          Mary wants John PRT eats
          'Mary wants John to eat'

(20) b.   Maria do   të   hajë Jani
          Mary wants PRT eats John eats
          'Mary wants John to eat'

Contrary to Greek, however, Albanian (as well as Rumanian) has at its disposal an extra complementizer which is employed in subjunctive constructions only. In the presence of this complementizer a subject can always precede the subjunctive particle as we see in (21).

(21).   Maria do   që   Jani të hajë
          Maria wants that John PRT eats
          'Maria wants for John to eat'

Whatever the precise role of që in (21) is, (probably similar to 'for' in 'John wants for Mary to win'), its unavailability in Greek results in the marked reading of the subject-particle order in (19a).

In the following, I will suggest that a way of explaining the

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word order facts in (19), as well as the lack of subject obviation in structures like (16), and at the same time account for the incompatibility of overt complementizers and the subjunctive marker, is to analyze sentences like (16), repeated below as (22), as an instance of the structural ambiguity in (23).

(22) O Yiannis theli na diavasi

(23) a. ... $V_{volitional}$ $[_{CP}$ $[_{C}$ PRT+V $[_{MP}$ pro $[_{M}$ t.

(23) b. ... $V_{volitional}$ $[_{CP}$ $[_{MP}$ PRO $[_{M}$ PRT V

Representation (23a) accounts for the postverbal position of an overt subject, namely, the word order in (19b) and is the result of an I-to-C movement the details of which I will not discuss here. On the other hand, (23b) is a control structure.

I further claim that subject obviation is indeed present in structures as in (23a) in Greek but its effect on (22) is concealed by (23b) which requires coreference between matrix and embedded subject. In other words, the behavior of the representation in (23a) patterns with the behavior of Romance subjunctives with respect to subject obviation, a fact to be expected if we consider subject obviation to derive from the anaphoric tense of subjunctives. On the other hand, the behavior of sentence (22) is reminiscent of the Aux-to-Comp structures familiar from Italian, in which I-to-C movement takes place and Case assignment to a postverbal subject becomes possible.

My claim further predicts that obviation is directly observed when the embedded subject is overt because no such element as overt PRO can be postulated and conceal the disjoint reference facts. The prediction is borne out in (24), the referential possibilities of which contrast those of (25) in which the embedded sentence is indicative. Notice that while disjoint reference is preferred in (25), coreference is nevertheless not impossible.

(24) O $Yiannis_i$ theli na diavasi $aftos_{j/*i}$
John wants PRT reads he
'John wants him to read'

(25) O $Yiannis_i$ ipe oti tha diavasi aftosj/i
John said that will reads he
'$John_i$ said that he will $read_{j/i}$'

It is then obvious why an overt complementizer will never be possible in sentences like (22). It will violate the PRO Theorem if the sentence involves the representation in (23a) and the Doubly-Filled-Comp-Filter if analyzed as in (23b).

To summarize, I have argued so far for the presence of the category PRO in subject position of subjunctive complement clauses of subject control predicates, object control predicates and volitionals in Greek. My conclusions argue against the standardly held idea that PRO must be ungoverned and thus construed with non-finite predicates only. As things stand, I am faced with two options to choose from: either to conclude that current syntactic theory is wrong and thus look for alternatives which will probably have to reject the idea of PRO as a distinct empty category (see analyses of Huang (1989) and Borer (1989)) or that the theory is essentially right but the licensing conditions for PRO need to be appropriately modified in order to accommodate the data I have presented. In this work I choose the second alternative, without discussing the shortcomings of already existing accounts of the first type when faced with the data under investigation.[2]

4. Licensing of PRO

In my analysis I will adopt Motapanyane's (1991) proposal - also implicit in Rivero 1988 - that the subjunctive markers of the Balkan languages head their own maximal projection, which she calls Mood Phrase (MP). I will also adopt Kayne's (1991) notion that controlled PRO is actually governed. Employing Chomsky's (1986) idea that the governing categories of a pronoun and an anaphor in subject position are different, Kayne allows PRO to be governed but only by an element within its maximal projection, since PRO Theorem is thus not violated. PRO, as he argues, is licensed via government by the verb that moves and adjoins to the IP, whose specifier position is occupied by PRO. Consequently, PRO selects its antecedent via Binding Theory.

Verb movement and the subsequent licensing of PRO can take place either at S-Structure as in Spanish and Italian or at LF like in English and French. In the first case the results of the V-adjunction to IP are directly observable. An overt complementizer is possible with the infinitive. Its occurrence does not induce a PRO Theorem violation since the verb that adjoins to IP blocks government of PRO by the lexical complementizer. In addition, object clitics appear postverbally. These facts are demonstrated by the Spanish sentence in (26).

(26) Maria no sabe si comer lo
Mary not knows if to-eat it
'Mary doesn't know if to eat it'

In English and French, V-adjunction to IP and the subsequent government and licensing of PRO take place at LF. A lexical complementizer is therefore not possible, as seen from (27a) and (27b), since a PRO Theorem violation is already induced at S-Structure and cannot be 'repaired' at LF. In addition, object clitics precede the infinitive as seen in (27b), from French.

(27) a. * Mary doesn't know if to eat it

(27) b. * Marie ne sait pas si le manger

In the following, I will discuss the details of the licensing conditions for PRO, and show that they reduce to the details of the verb movement that adjoins the verb to the highermost functional projection from where it governs PRO. Alternatively, I will demonstrate that the inability of a predicate to license PRO reduces to an improper verb-movement. Finally, I will illustrate that the reason why the Greek structures I have discussed license a PRO subject is due to the fact that the final step of the V-movement that the finite verb undergoes in Greek patterns with the corresponding step of the verb movement of infinitivals in languages like English or Romance and not with that of finite verbs of the same groups of languages.

In what follows, I will describe the process of V-adjunction to IP and the subsequent licensing of PRO in infinitival structures in languages like the Romance group.

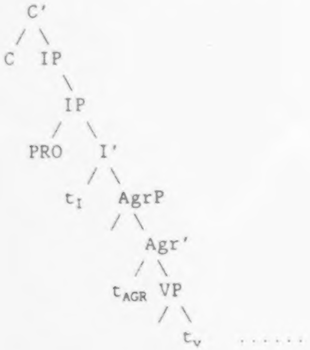
```
(28)       C'
          / \
         C   IP
               \
               IP
              / \
           PRO   I'
                / \
               I   \
                   INFNP
                    / \
               t_INFN  VP
                      / \
                    t_v    ......
```

With Guasti (1991), I will assume that Romance infinitives involve the functional head INFN that hosts the infinitival suffix. Immediately above it is found another functional head the existence of which has been independently argued for (Kayne 1991) and to which clitics attach. The exact label of this functional head is not clear and probably not relevant, and I will call it I at the present. What is relevant, however, is that this functional head does not carry lexical material with which the verb must amalgamate. Therefore, the infinitival verb on its way to adjoin to IP can skip over this empty head. This movement does not violate the HMC because the HMC is taken to be valid only insofar it reduces to ECP (Chomsky 1991) and ECP is indeed respected, as I will show immediately.

Following Rizzi (1990), I will adopt a conjunctive formulation of ECP and hold that a non-pronominal empty category has to be licensed (via head-government) and identified (via antecedent-government). The empty category that is crucial in the present configuration is the higher trace, t_{INFN}. Its identification requirement is satisfied via antecedent-government by the IP-adjoined verb. The same element however, the IP-adjoined verb, cannot satisfy the first requirement since it is not in A-position, and therefore cannot qualify as a head governor.[3] Nevertheless, the highermost trace in (28) is licensed via head-government by I and thus ECP is respected. Identical considerations will hold irrespectively of whether verb movement takes place at S-Structure or at LF, and consequently licensing of PRO will take place at either syntactic level.

Let us now turn to finite constructions in both Romance and Germanic languages and explain why V-adjunction to IP is impossible and thus a PRO subject cannot be licensed. Leaving irrelevant details aside, the structure of finite clauses in Romance and Germanic will look like in (29).

(29)

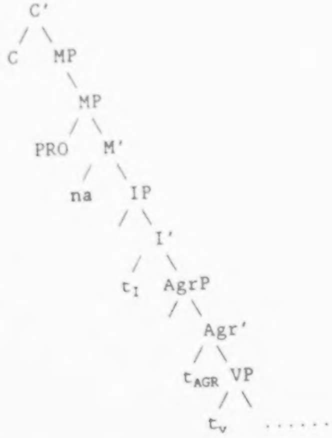


Notice that in finite sentences the verb has to pass through each one of the functional heads to pick up inflection. Therefore, it will always leave a trace in the highermost functional head position, which will be antecedent-governed by the IP-adjoined verb but will fail to be licensed via head-government, since the IP-adjoined head is in an A'-position. Therefore, in finite constructions verb movement and subsequent adjunction of the verb to the highermost functional projection will always result in an illicit trace and thus licensing of PRO will never be possible. Similar considerations will hold for verb movement at LF and thus PRO will not be licensed at either syntactic level with finite predicates in the above groups of languages. It is crucial, however, that finite structures in Romance and Germanic do not possess an empty functional head of the type assumed for Romance infinitives.

Finally, let us consider the licensing of PRO in Greek subjunctives which also involve finite predicates, (30). Judging from the preverbal position of the clitics in subjunctive clauses, the relevant verb movement must take place at LF. This fact is also confirmed by the incompatibility of subjunctive particle and lexical complementizer.

It is seen in (30) that the finite verb has to pass through each one of the functional heads in order to pick up inflection. The crucial factor that differentiates the structure in (30) from the one in (29), however, is the final step of the verb movement that adjoins the finite verb to the higher maximal projection. The finite verb in Greek subjunctives moves over the subjunctive particle immediately before adjoining to MP. Therefore, the I trace is antecedent-governed by the MP-adjoined verb and head governed by the subjunctive particle. Thus, it seems that the verb movement that licenses PRO in Greek subjunctives resembles the corresponding movement of infinitives in Romance (and probably Germanic) in that it also skips over a functional head before it finally adjoins to IP.

(30)



Notice that an analysis that posits the PRT-FINITE VERB complex to move together and adjoin to MP or that the particle alone does so must be abandoned on the grounds that they will both result in ECP violations of the type discussed earlier.

Based on these considerations, I conclude that the finite verb movement over the subjunctive PRT at LF and the verb's subsequent adjunction to MP from where it governs its specifier position, is responsible for the licensing of PRO in Greek subjunctive clauses. Similar considerations can be conjectured to hold in the rest of the Balkan languages where the subjunctive particle is available and perhaps in English and the rest of the Germanic where a particle of apparently similar nature is present.

NOTES

1. In the present context I will limit my discussion to subjunctives in complement position for reasons of space. I should point out, however, that a set of striking facts that argue for the presence of a PRO subject are also demonstrated by subjunctive sentences as sentential subjects.

2. This view is similar to the proposal made by Roberts (1991) concerning antecedent-government.

3. While apparently very attractive and most suitable for the facts I am discussing, both Borer's (1989) and Huang's (1989) accounts are faced with a number of problems which I will mention briefly. Borer does not have a clear way of capturing the fact that an overt complementizer can sometimes be compatible with Anaphoric AGR, as in (26). Furthemore, when turning to the facts that are particular to Greek, it is not obvious on what basis sentences as in (1) should be considered to involve anaphoric AGR while those in (2) should not, since Agreement inflection is identical for both embedded predicates.

On the other hand, Huang's approach that either an NP or AGR can be a controller, is contradicted by evidence found in languages like Greek, which happens to be a null subject language. Under his account, it is not clear why the reference of the null embedded subject in (i) is free, while the null embedded subject in (ii) can only refer to the matrix object.

(i) O Yiannis$_i$ ipe oti $e_{i/j}$ tha fai
John said that will eats
'John said that (he/she) will eat'

(ii) O Yiannis$_i$ prospathi na $e_{i/*j}$ fai
John tries PRT eats
'John tries to eat'

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ESCOL '91 371-382

APPENDICES, STRUCTURE PRESERVATION AND THE STRONG DOMAIN HYPOTHESIS*

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I. Introduction

Most current accounts of prosodic licensing (e.g., Steriade 1982, Itô 1986,1989, Goldsmith 1990) make use of a peripheral licenser to account for edge material which cannot be syllabified into word-internal syllable templates. However, some theoretical implications of this device have not yet been considered. This paper shows that the role of peripheral appendices in two languages in fact contradicts the recent proposals of Borowsky (1989) and Myers (1991) for the principles of structure preservation and the strong domain hypothesis, originally formulated by Kiparsky (1985).

Appendices differ from syllables and codas by being limited to word-edge positions, but appendices as prosodic licensers will interact with the syllable structures of a language to play a role in defining well-formed phonological words. I use here the theory of Harmonic Phonology, with its understanding of feature licensing and a two-level approach to phonological representation (see Goldsmith 1989). The two levels of analysis referred to are the Word or W-level, and the Phrase or P-level. Features must be licensed by the higher units of a level, such as the syllable, coda, and appendix, in accordance with the principles of prosodic licensing (Itô, 1986). It is possible within Harmonic theory that appendices may vary in licensing ability or in the possibility of occurrence from level to level, and this variance in the languages Tamil̲ and Luganda will give us evidence for the role of the syllable at word and phrase levels.

II. Tamil̲

The colloquial form of Tamil̲, a Dravidian language of South India, has a fairly restricted syllable structure. As discussed in Christdas (1988) and Bosch (1991), the first syllable of a phonological word is considered accented; that is, it has additional licensing properties such as allowing a distinctive point of articulation in the coda. The codas of non-initial syllables are more restricted, allowing only glides, laterals, and homorganic nasals and stops; therefore, they do license [nasal] and [lateral] but not [point of articulation].

```
(1)                   *
                      σ                        σ
               {all features}           {subset}
                  /   \                    /   \
                 O     R                  O     R
               /     /   \              /     /   \
                   N    coda                N    coda
                        [nasal]                  [nasal]
                        [lateral]                [lateral]
                        [poa]
                        [-syll]
```

If a stem ends with an obstruent which has a point of articulation, or if two obstruents bearing [poa] are juxtaposed, epenthesis ensures that the consonants are onsets rather than codas:

(2)	/kurut/	/kamp/	/paNp/	/teLiv/[1]
	a receptacle for grain	stick	disposition	clearness
nom Ø	[kurutɯ]	[kambɯ]	[paNbɯ]	[telivɯ]
acc /e/	[kurute]	[kambe]	[paNbe]	[teLive]
dat /kk/	[kurutɯkkɯ]	[kambɯkkɯ]	[paNbɯkkɯ]	[teLivɯkkɯ]
pl /kaL/	[kurutɯxa]	[kambɯxa]	[paNbɯxa]	[teLivɯxa]

We see this epenthesis also when the words are in phrases:

(3)	/pakkatt/ /uurile/	/unakk/ /anc / /ruupaay/
	next town-loc	to you five ruppees
	[pakkattɯ ʷuurile]	[ʷunakkɯ ?añjɯ ruubaa]

Word finally for nasals and laterals, the data is more complex. A one syllable stem ending in a nasal or lateral acts like the stems ending in obstruents in (2), with an epenthetic vowel before obstruent but not vowel initial endings:

(4)	/tuuN/	/kaNN/	/miin̲/
	pillar	eye	fish
nom Ø	[tuuNɯ]	[kaNNɯ]	[miin̲]
acc /e/	[tuuNe]	[kaNNe]	[miin̲e]
dat /kk/	[tuuNɯkkɯ]	[kaNNɯkkɯ]	[miin̲ɯkkɯ]

verb	/keeL/ 'hear'		
imper Ø	[keeLɯ]	pl /ngaL/	[keeLɯŋga]

Tamil̲ seems to require a stem to have at least two syllables (Christdas, 1988); thus epenthesis applies to meet this well-formedness condition, for nasal and lateral as well as obstruent final words.

For polysyllabic stems, however, the word-final nasals and laterals are not preserved by this regular epenthesis. If a polysyllabic stem ends in a nasal or retroflex lateral, that final consonant will be pronounced before suffixes (5a), before clitics (5b), and in compounds (5c).

(5)a) Suffixes:

	/avan̲/ he	/kaTan̲/ debt	/avaL/ she
acc + /e/	[?avan̲e]	[kaDan̲e]	[?avaLe]
dat + /kk/	[?avan̲ɯkkɯ]	[kaDan̲ɯkkɯ]	[?avaLɯkkɯ]

	/neeram/ 'times'
pl + /kaL/	[neeraŋga]

b) Clitics:

	/avan̲/	/kaTan̲/	/avaL/	/neeram/
+ /aa/ (question)	[?avan̲aa]	[kaDan̲aa]	[?avaLaa]	[neeramaa]
+ /taan̲/ (emphatic)	[?avandãã]	[kaDandãã]	[?avatãã]	[neerandãã]

c) Compounds:

/aayiram#aayiram/ thousand thousand	[?aayiramaayirõ] 'thousands and thousands'
/koLam#tooNTi/ pond dredge	[koLantooNDi] 'tool for dredging ponds'
/maram#ceTi/ tree plant	[marañceDi] 'vegetation'

If the word is spoken in isolation or at the end of the phrase, however, final consonants are lost, with nasality appearing on the preceding vowel in the case of a lost nasal consonant.

(6)	/avan̲/	/kaTan̲/	/avaL/	/neeram/	/maram/
	he	debt	she	time	tree
	[?avẽ]	[kaDẽ]	[?ava]	[neerõ]	[marõ]

/vantoom/	/vantaan̲/	/vantaan̲aam/
we came	he came	he came, reportedly
[vandõõ]	[vandãã]	[vandaanãã]

This is clearly a phrase-level process, for two reasons: 1) it creates non-phonemic nasalized vowels, violating structure preservation, and 2) these consonants sometimes do appear in phrases. Before vowel initial words in a phrase, the final consonant can be pronounced[2]:

(7) /avan̲/ /aaraampiccaan̲/ [?avan̲aarambiccãã]
'he' 'began'
/maram/ /ellaam/ [maramellãã]
'tree' 'whole'
/periya/ /maram/ /ille/ [periya maramille]
'big' 'tree' 'not'
/ilaikaL/ /aaccɯ/ [^{y}elaixaLaaccɯ]
'leaves' 'became'

Before obstruents to which the nasal can assimilate (in 8a), it may also be pronounced:

(8a) /en/ /kai/ [^{y}eŋkai]
'my' 'hand'
/verum/ /tantiram/ [veruntandirõ]
'mere' 'trick'
/nii/ /paaDam/ /paDi/ [nii paaDampaDi]
'you' 'lesson' 'study!'
/koncam/ /teriyum/ [koñjanteriyũ]
'a little' 'knows'

/neeram#kaalam#kiTayaat+aa/ [neeraŋkaalaŋkiDayaataa]
'time' 'season' 'isn't there' 'isn't there a (proper) time and season?'

(8b) /aayiram/ /ruupaay/ [aayirõruubaa] '1000 rupees'
/santeekam/ /vantaal/ [santeexãvandaa] 'if doubts arise'

In 8b) the nasal cannot assimilate, and so is not pronounced, as in (6) above.

Since the nasalizations in (6) and (8b) cannot occur without knowing whether the nasal or lateral can attach to the following word, the process must be phrase level. At word-level, these final consonants are not licensed by coda position because it does not license any [point of articulation] feature; therefore we license them by a word-final appendix at the W-level. The notion of appendix here differs from simple extraprosodic invisibility because it specifies which features are licensed at W-level in a well-formed word; thus it is as much a prosodic licenser as the syllable. It appears that these final consonants are not realized because they are not licensed at the Phrase-level; hence a Word-level appendix no longer licenses at Phrase-level:

(9) W-Level: Ω P-Level: none
|
[nasal]
[poa]
[lateral]

A well-formed phonological word in Tamil̲ consists of one accented syllable, followed by one or more unaccented syllables, with an optional appendix.

(10) $[\ \overset{*}{\sigma}\ \ \sigma_1^{n}\ \ (\Omega)\ ]$

Therefore, in the polysyllabic words which have affixes attached, the nasals are syllabified within syllables as expected from the template in (1); they will assimilate to a following stop as in /neeram+kaL/ = [neeraŋga] for example. We see that they can also syllabify into the template across word boundaries, becoming onsets before vowel initial words. That they take up an onset position is also shown by their preempting glide insertion before non-high vowels:

(11) /ellaam/ [^{y}ellää] 'all' [maramellää]
/aaccɯ/ [?aaccɯ] 'happened' [maramaaccɯ]

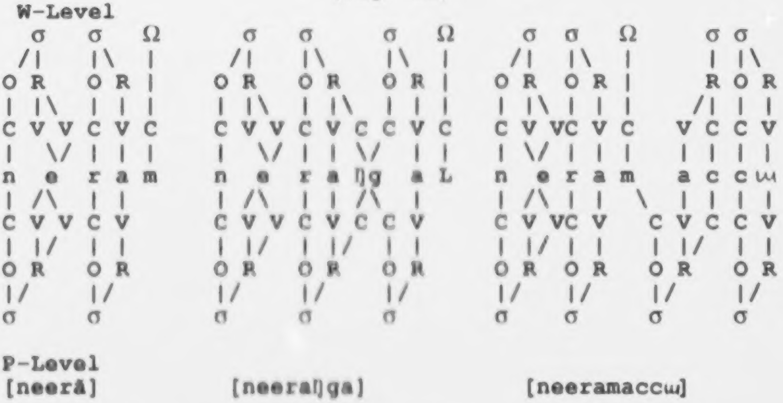
The onset is not filled with a glide because the nasal fills that position. Nasals syllabify as codas before stop-initial words, as shown by their assimilating like word-medial codas in (8a).

Thus at the level of analysis of phrases, we have evidence of syllabification across word boundaries in cases where the consonant can be licensed by only the syllable and coda, without any reference to an appendix.

This shows that the regular syllable template requirements continue to be in force -- absorbing appendix material where it can be licensed as a coda or onset, but allowing no extra favors for word-final position.

The disappearance of the appendix is evidenced by the data on words in isolation and before pause, and it also results in evidence for the continuing role of the syllable template. Although a word may be well formed at W-level, a final consonant is deleted in order to satisfy the restrictions on syllabification at P-level if it cannot be otherwise licensed by syllabification into an onset or coda. Figure (12) shows how a consonant must be properly licensed on both levels in order to surface.

(Fig. 12)



So to summarize, an analysis of colloquial Tamil syllable structure shows that a word-final nasal or lateral must be licensed properly at two levels: by an appendix at Word-level, and by an onset or coda post-lexically. Failing to achieve proper licensing at P-level results in nasalization and deletion to conform with the syllable template. Note that the nature of the final consonant must be specified at the word level, since any consonant may be syllabified in an onset position at phrase level.

III. Luganda

Luganda, a Bantu language of East Africa discussed by Tucker (1962) and Clements (1986), has an even simpler principle was developed for segmental constraints and held only throughout the lexical phonology; post-lexically new segments may be created. Borowsky (1986) and Itô (1986), among others, suggest that structure preservation can be extended from segmental constraints to suprasegmental constraints like syllable structure, and that similarly these constraints would hold only in the lexical phonology: "In the post-lexical phonology, syllable structures not conforming to the template or to other syllable conditions can be created, since Structure Preservation no longer holds," (Itô 1986, p. 12). The results of appendix loss, however, contradict claims that syllable structure restrictions are not preserved after the lexicon. The fact that various strategies (nasal deletion in Tami<u>l</u>, prenasalization in Luganda) must be employed to bring the results of appendix loss in line with the usual syllable structure restrictions argues strongly that syllable structure preservation is necessarily <u>not</u> turned off after the lexicon; otherwise we would expect all appendices to surface.

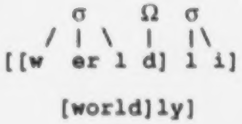
Borowsky (1986, 1989) argues from English appendices which do surface, as evidence that syllable structure preservation no longer holds after Level 1. Her arguments implicitly rely on ruling out the appendix structure after Level 1, which forces the incorporation of their material into syllables, and thus results in increased syllable possibilities post-lexically. Also, if appendices are necessarily peripheral, appendix material at level 1 must be incorporated into a syllable if affixation applies at later levels.

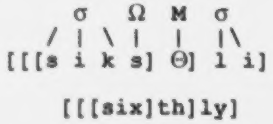
```
(18)
level 1         σ                         σ
              /   \                     / | \
             X     X  (X)              X  X  X   (X)   (X)
             |     |   |               |  |  |    |     |
             e     l   k               w  o  r    l     d


level 2         σ             level 2     σ         σ
              / | \                     / / | \ \   / \
             X  X  X                   X  X X  X X  X  X
             |  |  |                   |  | |  | |  |  |
             e  l  k                   w  o r  l d  l  y
                                                   (1989: 160)
```

However, if appendices are considered peripheral by virtue of being adjacent to a word boundary, then the distribution of appendices in the same word-peripheral manner at each level accounts for her English data. In order to handle the apparent coda violations at the edges of words which are medial after suffixation, we use the notion of recursive word formation (Goldsmith 1991, Bosch 1991), and allow the appendix licenser in English to remain at the edges of full words, despite added morphemes. So, for example, we would analyze

(19)





as being composed of complete words, with word appendices and added morphemes. Appendices are still distributed in a principled way; they may only occur at the edge of a full word. Morphemes added within a word (the close juncture of earlier descriptions) must comply with the syllable template for English, however it may be defined. Since there is no evidence that these appendices ever behave as parts of syllables in English phonology, there is no evidence that these appendices do not continue to exist past Level 1.

Therefore, Borowsky's arguments for English do not show that syllable structure violates structure preservation at later levels, unless we assume pretheoretically that appendices must be lost post-lexically in all languages. Data from other languages where appendices are clearly lost in fact show that structure preservation still holds for syllable structure at the post-lexical levels.

V. Strong Domain Hypothesis

Myers' squib (1991) agrees that there can be postlexical preservation of syllable structure, noting that even in Borowsky's examples from English, onset restrictions continue to hold. However, he suggests a connection of structure preservation with the Strong Domain Hypothesis that rules may only cease to apply, but never begin to apply, at later levels. Myers extends this to cover restrictions on syllables structures, suggesting that a restriction may only turn off, "thus allowing a broader range of structures, but it cannot be turned on to narrow the range" (p. 383).

In the case of Tamil, we saw that the appendix and syllable licensers together capture the restrictions on a well-formed phonological word. When the appendix licenser is not available at phrase level, the range of permissible structures decreases in contrast to Myers' suggestion. Thus a word may end in a certain type of consonant in the Tamil lexicon, but not on the surface; our range of structures is narrowed by the loss of an appendix. Data from appendices here suggest that the strong domain hypothesis does not apply to syllable structures in the same way as to segmental structures, as overall word restrictions may increase after the lexical level.

Conclusions

I have argued that appendices posited at the W-Level may then at the P-Level 1) be disallowed (Tamil) 2) be limited (Luganda) 3) remain word peripheral (English among others). It appears that appendix distribution can be independent from changes in syllable structure; for example, in Tamil we do not want to suggest that the syllable and coda licensing requirements change at all from level to level. In cases where the appendix licensing is not available at P-level, the language employs strategies to meet the remaining prosodic licensing conditions; therefore, these languages show the continuing dynamic role of P-level licensers. This implies that the principles of structure preservation and the strong domain hypothesis, originally designed for segmental constraints, cannot be applied to prosodic structures in the same manner.

FOOTNOTES

* This material is based upon work supported in part by the National Science Foundation under Award No. BNS-9009678, and has been improved by comments from John Goldsmith and Bill Darden. I take full responsibility for any and all remaining errors.

1. Data for some isolated words is taken from Christdas (1988). Otherwise, particularly for phrases, data is from tapes of the Basic Tamil Reader (Lindholm and Paramasivam, 1980), recorded in spoken colloquial style by Sam Sudaananda (of Tamil Nadu, India). Retroflex consonants are capitalized, and alveolars are underlined.

2. I have not determined all the factors involved, which include style, rate and the nature of the phrase. It is sufficient for the argument that the consonant must be available at phrase level in some cases.

3. n.b.: Licensing differs from association; a feature

must be licensed by at least one of the positions to which it is associated, then it may freely attach to other positions. Thus geminates have all their features licensed by the onset position to which the melody is attached; in a nasal-stop cluster, the coda need license only nasality.

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ESCOL '91 383-392

LEXICAL FUNCTIONAL DISTINCTIONS IN MOHAWK VERB AGREEMENT MORPHOLOGY

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1.0 Introduction

In this paper we will examine the interaction between agreement, noun incorporation and verb raising in Mohawk. We will argue that verb heads in general raise to an aspect head and agreement will be treated as pronoun incorporation from Spec-VP and Spec-AspP. The complex will then further raise to the higher tense-definite head.

We will examine the Mohawk in light of recent proposals by Roberts (1991) and Baker and Hale (1990) and we will show that the Baker/Hale approach will also account in a direct way for certain non-core constructions.

1.1 Mohawk agreement system - the basic facts

Mohawk exhibits a split-active/stative agreement system. As shown in (1), transitive verbs agree with both subject and object. Intransitive verbs divide into so-called active and stative verbs, and Baker (1989) has shown that active and stative agreement forms are identical to the transitive form with either neuter object or subject respectively. This is shown in (2a-b).

(1) Mohawk transitive agreement = fused agreement
Data from (Deering and Delisle, 1976)

a. I like him   rinon:we's
(ri = I-him)

(2) Mohawk intransitive agreement also = fused
Data from (Deering and Delisle, 1976); insight from (Baker 1989)

a. active = transitive with neuter (0) object

he likes it   ranon:we's
he hunts   rato:rats

b. stative = transitive with neuter (0) subject

it likes him   ronon:we' s
he sleeps   ro:ta's

The linear template of obligatory elements is as in (3)

(3) a. 'TENSE' - FUSED AG - VERB STEM - ASPECT

b. Ø - ra- nohare-s 'he washes it'
[pres-he/it- wash - habitual]

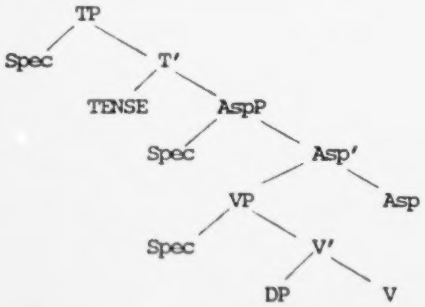
en- ha -nohare-' 'he will wash'
[future-he/it- wash - punctual]

Dependencies exist between TENSE and Asp which suggest that TENSE and Asp adjacent heads.

(4) Dependencies between TENSE and Asp
Ø-habitual
en-punctual

Therefore we suggest the structure in (5) for Mohawk. Note that there is a great deal of scrambling in Mohawk; we suggest that subject or object NP freely move move to Spec TP; or they may be postposed as discussed below.

(5) Mohawk sentence structure



We can suggest that active subjects will get mapped to Spec-AspP, and that Spec-VP will be filled by a pronoun depicting another theta role of the verb. This will be an A' position, and hence can duplicate the object, if no other theta role is available.

If V raises to Asp, then Asp will govern anything that V originally did by (cf. Baker's (1985) discussion of HMC, or other constraints, and the agreement markers in the two spec positions will be free to cliticize to the V-Asp head. Following Baker's (1985) Mirror Principle, we would expect the order Agent-Other-V-Asp, which is almost what we do find. However, if one of the prefixes is 3rd sg. masculine, then it will appear first, suggesting that a single constraint operating over the two prefixes ought to be in effect at a single time. Hence, V to Asp raising will then allow cliticization of agreement.

In (5) Mohawk has been given as an SOV language -- this is not uncontroversial; Mohawk has a great deal of scrambling. However, (6) presents evidence that the non-scrambled word order is SOV.

(6) Evidence that non-scrambled order is SOV

a. Non-root sentences has object before V
(Data from S. Harris, class notes, F91)

ikehleh onenste akekeh
I want corn for me to eat

*ikehleh akekeh onenste
I want for me to eat corn

b. Spec TENSE is A' position, Either subject or object NP or other arguments can appear there.

c. Demoted focus requires new head neh to license rightward moved NP .
(Data from Michelson (1980); (interlinear changed slightly)

ne ka:ti? kenh nayoyaneratye?
it be-thus part. how should it be good
SPEC-TP

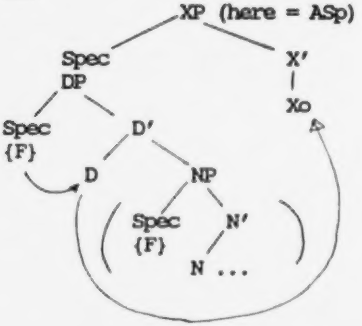
-ne sa?niku:ra?
neh your mind
'DEMOTED FOCUS'
'How then can your mind continue to be well?'

As per usual, we assume that the accusative or absolutive case is marked by the lexical head V, and the nominative by a functional head, here Asp. We then suggest that agreement markers come from Spec of the two phrases; here we follow Wright (1987) and suggest that for languages which lack case marking, and have instead verb agreement, that the agreement marker is actually a D head of DP which may or may not take a complement NP. Hence agreement marking will be as in (7).

(7) Agreement features are in Spec of head;

Agreement in Mohawk is Spec-head indexing and incorporation of D into governor

ex.



1.2 Quirks of the system

We have thus far assumed that a single mapping of the proper theta role to either Spec-VP or Spec-Asp with incorporation will give correct active or stative forms. However, two problems concerned with aspect exist:

(8) 1. Perfectives
Verbs which take active morphology in general take stative morphology in the perfective. (Non-adjectival stative verbs retain stative marking in the perfective):

(i)	he sleeps	ro:ta's
	he has slept	rota:'on
(ii)	he hunts	rato:rats
	he has hunted	rotora:ton

2. Habituals
Verbs which normally take stative morphology take active morphology when a new habitual state has arisen:

(i)	tehohwishenhe:ion-0	he is tired
(ii)	tehahwishenhe:ion-s	he gets tired (these days)

1.2.1 Perfectives: A Solution

We have suggested a distinction between ra and ro, in that the ra is marked by and cliticizes to a functional syllable structure, with only homorganic stops and nasals allowed in the coda, resulting in geminate clusters only. An analysis of the W-level (Clements 1986, Wiltshire 1991) posits nasals before stops as well, which surface as prenasalized stops.

(13)				
	[maggwa]	'thorns'	[lyee.ᵐvu]	'ripe banana'
	[mañño]	'teeth'	[lu.gaa.ⁿda]	'Luganda'
			[muu.ⁿtu]	'(the) man'

Syllabic homorganic stops and nasals appear word-initially as well; thus we require an initial homorganic appendix which is freely distributed at word level.

(14)

/kkubo/	[k̩kubo]	'path'	/ddaala/	[d̩daala]	'step'
/bbanja/	[b̩baⁿja]	'debt'	/mmere/	[m̩mere]	'food'
/nnoni/	[n̍noni]	'chalk'	/ŋŋoma/	[ŋ̩ŋoma]	'drum'
/mva/	[m̩va]	'relish'			
/ngokka/	[ŋ̩gokka]	'when you are coming down'			

When put into a phrase, a nasal appendix will form a prenasalized stop and the preceding vowel will lengthen compensatorily, filling the slot held by the appendix.

(15) /saagala#mva/ [saagalaaᵐva]
'I don't like relish'

/ba+naa+tunda#N+tebe/ [banaatuuⁿdaaⁿtebe]
'they will sell chairs'

/a+li+yimba#N+buzi#N+saata/ [aliyiiᵐbaaᵐbuziiⁿsaata]
'he will tether the fat goat'

Thus the appendix licenser previously available for the word is available only at the beginning of a phrase, and phrase medial consonants must be licensed by the syllable template alone.

While phrase-initial words may have an initial syllabic homorganic stop or nasal, the syllable template allows only stops and not nasals[3] (except geminates) in the coda at phrase level. Then the licensers we need are given below:

(16) W-Level coda Ω (word initial)
| |
{nasal} {nasal}

```
P-Level    coda              Ω  (phrase initial)
            |                |
          {grid}          {nasal}
                          {grid}
```

Therefore, prenasalization and compensatory lengthening are seen at the P-level when appendix distribution is restricted.

```
                       Fig. (17)
 W-Level          (peripheral)
        σ   σ   σ    Ω    σ                    Ω    σ
       /|   |\  |\   |   /|                    |   /|
      O R   O R O R  |  O R                    |  O R
      | |\  | | | |  |  | |                    |  | |
      C V V C V C V  C  C V                    C  C V
      |  \/ | | | |  |  | |                    |  | |
      s  a  g a l a  m  v a             vs.    m  v a
      | /\  | | | | \ \ | |                    |  | |
      C V V C V C V  V  C V                    C  C V
      | |/  | | | | /   | |                    |  | |
      O R   O R O R     O R                    |  O R
      |/    |/  |/      |/                     |  |/
      σ     σ   σ       σ                      Ω  σ
                                           (still
                                       peripheral)
 P-Level
           saagalaaⁿva                          mva
```

Fig. (17), like (12), shows that proper licensing at both levels determines how a melody appears.

IV. Structure Preservation

Both these cases provide evidence for a prosodic licenser which is lost or more restricted at the phrase level. In these languages, when the appendix is not available, material which was previously licensed is stranded and must be incorporated into the usual syllable template if it is to be realized. Material not licensed by the syllable template is deleted, as for the final nasal and lateral consonants in Tami<u>l</u>, or the syllable affiliations may alter, as in the syllabic nasals of Luganda joining with a following stop onset.

The principle of structure preservation, as formulated in Borowsky (1989, based on Kiparsky, 1985) is that "language-particular structural constraints holding for underlying representation hold also for derived representations, and vice versa" (p. 148). This head, whereas the ro type is marked by a lexical head, which then moves to the higher head.

We suggest that lexical heads in Mohawk are those heads which subcategorize for theta roles, including the role Event (following Sproat (1985). Perfective will thus regularly mark ro, since it marks event.

1.2.2 Other stative forms

The stative marking also occurs in two other cases: (1) Benefactive or 'possessor' marking when there is noun incorporation and (2) demoted agents in perfective passives.

(9) Benefactive agreement (Oneida Data from Michelson (1991))

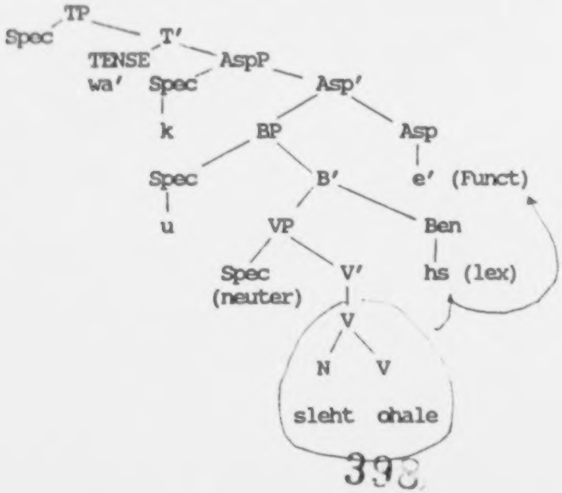
Wa'—k-u—[sleht-ohale]-hs—e' ...
MODE—1s/2s—[car—wash]—BEN-ASP ...
'I washed (his) car for you.'

(10) Passive agent marked objective
(Mohawk Data from Bonvillain (1973) (Orthography changed to conform with the remainder of examples)

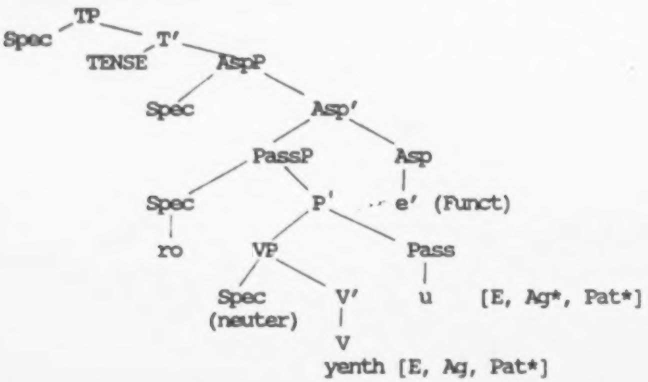
ra-yenth-os	he's planting (act.) 3.m.sg.active.agreement
ka-yenth-u	it is planted (pass.) neuter.object.agreement
ro-yenth-u	it was pl. by him (Pass.) 3.m.obj agr.

Note that in both cases we have morphology which crucially refers to theta-roles and hence the suffixes must be lexical heads rather than functional heads. The trees corresponding to (9) and (10) will then be as in (11) and (12).

(11) Oneida sentence structure - Wa'kuslehtohalehse'



(12) Mohawk sentence structure - royenthu



Note that in both of these cases, the Spec of Asp, and the Spec of the lexical category beneath are what is involved in agreement, in (12), Passive, being a lexical category referring to theta roles will mark ro, Spec of AspP will be neuter, and the proper form will appear. The same reasoning applies in (11).

1.3 Habituals

The solution to be advocated here is similar to that above, but at one level higher. The argument goes as follows: (1) There are four possibilities for 'TENSE or MODE head (cf. Bonvillain (1973: 163-88)): three of these are what we expect in this type of position, a definite or aorist 'wa?', indefinite 'a', future 'en'. The fourth is the duplicative t(e) found here which "expresses a variety of ideas, all of which share the basic idea that more than one person, object, action or state is involved, i./e. that a "lexical" head is in the head-position above Asp.

We suggest then that the reference to action or state will involve a filling of the VP Spec with a neuter prefix -- nothing in what we have seen has any constraints on Spec of VP — only that Agents in the usual case appear outside of VP, i.e. in Spec-AspP. This leaves SpecAsp open, and the features of masculine can occur on this Spec, yielding the active form which we expect from that position.

2.0 Previous proposals for constraining incorporations

2.1. Baker and Hale's approach

Baker and Hale (1990) discuss asymmetries between incorporation of a noun into a governing verb and incorporation of a pronoun. An example of a crucial case is shown below in (13). (13) shows determiner stranding in

Southern Tiwa. (13b) is fine, although a parallel one with a preposition must move N to preposition to V.

(13) Southern Tiwa Det stranding
Baker and Hale (1990), p. 291
(data listed as from Allen, Gardiner and Frantz (1984).

a. [Yede seuan-ide] a----mu--ban
that man-suf 2S/A-see-past
You saw that man

b. [DP Yede [NP [N(i) e] a----seuan-mu--ban
that 2S/A-man---see-past
You saw that man

c. Only lexical head count as closer governor for lexical antecedent in lexical governor position

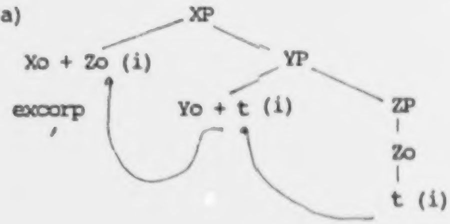
Baker and Hale argue that the NP can move directly to the V, and that the intervening D-head will not be a closer governor for the antecedent in the V, hence there will be hence V can be aa proper governor, for N.

2.2 Roberts position

Roberts is concerned with capturing the distinction between those examples of apparent head-to-head movement which allow part of the incorporated element to move onward, leaving the host element behind, and those which do not.

His examples of further movement, which he calls excorporation involve clitic climbing and verb second phenomena. (14a) shows a geometric configuration apparently involved in these cases, and (15a and 15b) are Roberts examples of Italian clitic-climbing and Dutch verb movement respectively, following Kayne (1989).

(14a)



(15) Examples from Roberts (1991), p. 212

a. Italian

{La volevo} {t chiamare} {t} ieri
her I-wanted to-call yesterday
'Yesterday I wanted to call her up

Dutch

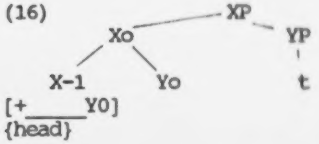
Gisteren {had} ik [mijn vriedin op t] {t willen bellen}
yesterday had I my girlfriend up want call
'Yesterday I wanted to call my girlfriend up

{} marks relevent heads.

He suggests that"excorporation seems to be impossible in the genuine morphological cases of head to head movement, such as noun incorporation and affixation," since the antecedent in Xo cannot have xo as governor since there is an intervening governor Yo without the antecedent.

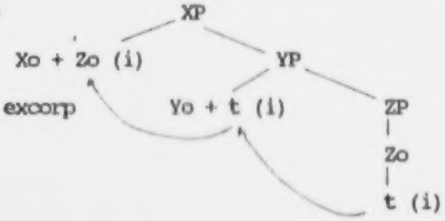
He suggests that the difference then is morphological versus purely syntactic, in that a morphological head host will subcategorize for the incorporated element at a level lower than Xo, i.e. as in Roberts (6a), repeated here as (16).

(16)



This will be in contrast to the excorporation type which will allow movement out. Roberts suggests that in his type, the first incorporation will have Xo and Yo as 'conjuncts', and hence there will be no 'head', there will be a joint head, but neither of the parts will be a head. When the incorporee moves on, the first host will no longer function as a head for the purposes of government, and hence the lower trace will be properly governed by the new position, as shown in (17):

(17)



We can see that Roberts approach cannot account for the Mohawk data, because it assumes that all subcategorization will be done at the lowest level, and not at a level in which there is interaction between Aspect and Verb subcategorization.before. In the case of the perfective versus non-perfective aspect, both subcategorize for verbs, and can even take verbs with incorporated nouns; clearly the geometry is the same. In the case of habitual vs. stative, we have an apparent case of "excorporation", since 3rd ms. moves to a higher position, ultimately cliticizing to the te head, yet Patient is subcategorized for by the verb.

We also can see that Baker and Hale's approach can account for Roberts' examples:

(18) Roberts examples revisited

Clitic climbing: Since clitic = D, and D can be head and sole member of DP; what needed for clitic climbing are empty Specs through which DP can pass, until last incorporation site: Spec VP not A position in Italian, hence DP can pass through.

a. Italian

{La volevo} {t chiamere} {t} ieri
her I-wanted to-call yesterday
'Yesterday I wanted to call her up

(19) Verb-second:

Dutch

Gisteren {had} ik [mijn vriedin op t] {t willen bellen}
yesterday had I my girlfriend up want call
'Yesterday I wanted to call my girlfriend up

If we assume that had is in an aspect head, then INFL will be the closest functional governor.

Conclusion

In conclusion, we have argued that Mohawk agreement, both in the regular case, and in non-core cases can be handled by assuming that features of Specs of both a single "lexical" category and a functional category combine and incorporate into a joint head. This type of incorporation follows from the constraints of Baker and Hale (1990) system, and violates tenets of Roberts (1991) system.

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ESCOL '91 393-404

EXPLETIVE RAISING AND EXPLETIVE REPLACEMENT IN DUTCH

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Recently, two competing analyses of expletives of the there type have been put forward. Chomsky (1986a, 1989) argues that these expletives are meaningless elements that are freely inserted at S-structure and have to be replaced at LF by the NP the expletive is associated with (the associate). Moro (1990) argues that these expletives are small clause predicates, to be raised at S-structure, as in ordinary copular constructions and constructions of Locative Inversion as analyzed in Hoekstra & Mulder (1990). In this paper I will argue that the Dutch expletive er has exactly the properties one would expect it to have under either analysis. Hence, I conclude that there are two types of expletive constructions, expletive replacement and expletive raising, and that whereas Dutch has both types of expletive constructions, English has only expletive raising.

1. Expletive Constructions in English

There are three salient properties of English expletive constructions that any analysis of them should capture (in this paper, the term 'expletives' refers to expletives of the there type only).

The first property is, that the associate must be indefinite (Milsark 1974, cf. Reuland & Ter Meulen 1987).

(1) a. There will be trouble ahead
b. * There will be the trouble with Harry ahead

Second, the verb must be unaccusative.

(2) a. There was happiness
b. There arrived a package
c. * There danced a couple
d. * There bought a man a house

There are two interesting types of exceptions to this requirement. First, passives are considered to be unaccusatives, but are not allowed in expletive constructions.

(3) a. * There was danced
b. * There was arrested a man

Second, unergative verbs are allowed in expletive constructions, provided they are accompanied by a locative PP.

(4) a. * There hung a picture
b. There hung a picture on the wall

I will leave the case of passives aside, noting that the fact that they are ungrammatical doesn't undermine the generalization that only unaccusative verbs are allowed in expletive constructions (cf. Zwart 1991).

As for the unergatives, it has been argued extensively by Hoekstra & Mulder (1990) that unergatives accompanied by a locative PP are unaccusatives. An example is given in (5).

(5) a. A picture hung on the wall
b. On the wall hung a picture [locative inversion]

The locative PP in (5) is analyzed as the predicate of a small clause, which has a picture as its subject. Both the subject and the predicate can raise to the structural subject position. However, if raising takes place, the verb cannot assign an external theta role, hence, by Burzio's Generalization, it must be unaccusative. The structure of (4b) is a little more complicated, as will become clear below. However, I will assume that the Hoekstra & Mulder analysis is correct, which means that unergatives accompanied by a locative PP confirm the generalization that expletive constructions in English are only allowed when the verb is unaccusative.

A third salient property of expletive constructions in English is that they force an existential reading of the associate NP (Milsark 1977).

(6) a. Many men are in the garden
b. There are many men in the garden

(6a) has two readings, to be called 'presuppositional' and 'existential', respectively:[1]

(7) a. many men are such that they are in the garden
b. a situation exists such that many men are in the garden

(6b) lacks the reading in (7a).

I will have little to say about the definiteness effect in existential constructions. The other two salient properties of expletive constructions play a crucial role in the evaluation of the two competing analyses of expletive constructions mentioned above. But this becomes much more clear if we take a look at the properties of expletive constructions in Dutch first.

2. Expletive Constructions in Dutch

Of the three properties of expletive constructions in English mentioned in section 1, only the definiteness effect appears to be present in Dutch.

(8) Er stond een/*de regenboog boven het meer
there stood a the rainbow over the lake

Expletive constructions occur with all kinds of verbs, unergatives and unaccusatives, actives and passives.

(9) a. Er was geluk
there was happiness
b. Er kwam een pakketje binnen
there came a package in
c. Er danste een paar
there danced a couple
d. Er kocht een man een huis
there bought a man a house

(10) a. Er werd gedanst
there was danced
b. Er werd een man gearresteerd
there was a man arrested[2]

Also, the expletive does not force an existential reading of the associate NP, as noted by De Hoop (1990).

(11)a. dat veel katten in de tuin waren
that many cats in the garden were
b. dat er veel katten in de tuin waren
that there many cats in the garden were

Thus, both (11a) and (11b) allow the presuppositional reading:[3]

(12) many cats are such that they were in the garden

As demonstrated by De Hoop (1990), there are two ways to disambiguate (11b). First, the two readings require different stress patterns.

(13)a. dat er veel KATTEN in de tuin waren [existential]
b. dat er VEEL katten in de TUIN waren [presuppositional]

Second, scrambling brings out the presuppositional reading of the associate.

(14)a. ? dat er veel KATTEN gisteren in de tuin waren
that there many cats yesterday in the garden were
b. ? dat er gisteren VEEL katten in de TUIN waren
that there yesterday many cats in the garden were

With the stress patterns reversed, both sentences in (14) are completely acceptable.[4]

De Hoop (1990) also shows that individual level predicates are allowed in Dutch existential constructions, contrary to English (Milsark 1977).

(15)a. there are many people sick
b. * there are many people intelligent

(16)a. er zijn veel mensen ziek
there are many people sick
b. er zijn veel mensen intelligent
there are many people intelligent

The distribution of stress reveals that individual level predication and existential interpretation do not combine, just as in English.

(17)a. * er zijn veel MENSEN intelligent
b. er zijn VEEL mensen intelliGENT.

Therefore, (11b) is ambiguous between an existential reading and a non-existential reading, and it is the latter reading which allows individual level predication.

In section 5 I will present an even stronger argument to back up the claim that the Dutch expletive constructions are ambiguous. First, however, let us consider the expletive replacement analysis of Chomsky (1986a,1989) and the expletive raising analysis of Moro (1990), and see how well they account for the properties of English and Dutch expletive constructions.

3. Expletive Replacement

In Chomsky (1986a), a principle of Full Interpretation is proposed, according to which an element that does not contribute to the interpretation of a sentence cannot be present at LF. According to Chomsky (1986a,1989), expletives are a case in point. Since expletives cannot survive at LF, they have to be removed. In Chomsky (1986a), the associate moves to the position of the expletive at LF, and replaces it. The LF movement explains certain locality conditions on the relation between the expletive and the associate, as LF movement leaves a trace behind which has to satisfy the ECP.

However, if the expletive is fully replaced by the associate, two of the three properties of expletive constructions mentioned in section 1 seem to be hard to account for, viz. the definiteness effect and the forced existential interpretation. It is not clear why the expletive could not be replaced by a definite NP, so that (18a) would have the interpretation (18b), as both would have the LF representation (18c).

(18)a. * There will be the trouble with Harry ahead
b. the trouble with Harry will be ahead
c. [the trouble with Harry]$_i$ will be [t$_i$ ahead]

Also, it is not clear how the expletive could block any reading if it were completely replaced at LF.

For this reason, Chomsky (1989) assumes that the expletive is an LF affix, which needs to be adjoined to in order to become a legitimate LF object. The adjunction takes place, again, by LF movement of the associate. As part of the complex resulting from the adjunction, the expletive can play a role in determining the definiteness effect and in forcing the existential interpretation. This is the analysis I will refer to as 'the expletive replacement analysis'.[5]

There are a few problems with this analysis. First, the restriction to unaccusative verbs is a mystery under this analysis. This is important, because it is not a universal property of expletive constructions that the verb has to be unaccusative, as we have seen.

Second, it is not immediately clear why adjunction of the associate to the expletive would block the presuppositional or proportional reading of the associate. Suppose, for example, that the expletive is a scope marker, as in Williams (1984). Adjunction of the associate to the expletive would yield a structure as in (19).

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(19)           expletive      ...//...    t_i
                   /\
        expletive     associate_i
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In (19), the associate must be able to c-command its trace, otherwise the ECP would be violated. More generally, after expletive replacement the associate c-commands everything the expletive c-commands.[6] So if the two possible readings in existential constructions are to be expressed in terms of scope, it is unclear why one of the readings would be blocked, since the expletive and the associate have the same scopal domain. In short, the representation in (19) predicts a state of affairs that doesn't exist in English, but does exist in Dutch: both the expletive and the associate can take wide scope.

Of course, there are ways, other than through scope, to express the fact that the expletive forces an existential reading in English. But any other way would face the problem that somehow expletives in Dutch behave differently in this respect. As we will see, this problem does not arise in the expletive raising analysis.

4. Expletive Raising

A different analysis, developed in Moro (1990,1991a,b), starts off with the counterintuitive assumption that *there* is not an expletive but a predicate. Being a predicate, *there* is a legitimate LF object, so expletive replacement is never an issue in this analysis.[7]

The observation that expletive constructions (in English) crucially involve unaccusative verbs is the key to this analysis. All other unaccusative constructions involve raising, and especially copular constructions take a small clause complement of which both the subject and the predicate can be raised. Consider (20).

(20)a. is [John [the culprit]]
b. John$_i$ is [t_i [the culprit]]
c. [the culprit]$_j$ is [John t_j]

From the D-structure (20a), both S-structures (20b,c) can be derived. In the last example, the small clause predicate has been raised instead of the small clause subject. Assuming the analysis of Hoekstra & Mulder (1990), Locative Inversion constructions as illustrated in (5) are an instance of the same phenomenon.

The assumption that *there* is a raised predicate therefore makes it possible to generalize over all copular constructions, and potentially over all unaccusative constructions.[8] On this assumption, expletive constructions have the following representations, before and after raising.

(21)a. is [happiness there]
b. there$_i$ is [happiness t_i]

A potential problem that the expletive raising analysis faces is the following. If both locative PPs and expletives are small clause predicates, then what is the structure of a sentence like (4b)?

(4) b. There hung a picture on the wall

The problem in (4b) is that there are two potential predicates, so either the PP is an adjunct here, or the expletive is a real expletive after all. We will return to this problem in section 6.

How does the predicate raising analysis account for the properties of expletive constructions in English and Dutch? As for English, the restriction to unaccusative verbs follows straightforwardly. Only unaccusative verbs do not assign an external theta role and therefore, by Burzio's Generalization, allow raising. Similarly, the fact that the expletive forces an existential reading is predicted by this analysis. *there* is a predicate, therefore it is not meaningless, and the structure (19) will not occur. Hence the expletive has scope over the associate at LF.[9]

As for Dutch, the expletive raising analysis makes a clear prediction. Since expletive constructions are not restricted to raising constructions in Dutch, we expect expletives in Dutch to not, or not always, behave like raised predicates. If the expletive raising analysis is correct, 'behaving like a raised predicate' means 'forcing an existential interpretation'. As we have seen, the existential interpretation is not generally forced in Dutch expletive constructions.

To conclude, it looks like the expletive raising analysis satisfactorily accounts for both the properties of English expletive constructions and for the fact that English and Dutch differ in this respect.

Of course, on this analysis the question rises what Dutch expletive constructions do look like. Are they completely different from English expletive constructions, or do they really comprise two types, the English type, limited to raising contexts and forcing an existential interpretation, and an additional type, lacking these properties? To answer this question, let us take a closer look at expletive constructions in Dutch.

5. The Effect of PP Extraposition

In section 3, we have seen that expletive constructions in Dutch can be disambiguated by particular ways of distributing stress and by scrambling of the associate NP. It is well known that a scrambled NP has a specific reading in Dutch (see Kerstens 1975, Reuland 1988), and that existential constructions require non-specific NPs.[10] So for all we know, it could be that there is just one type of expletive construction in Dutch, and that the ambiguity of (11b) is a function of specificity.

However, it can be shown that (11b) is truly ambiguous, and that in one of the readings the construction has exactly the properties of expletive constructions in English.

In Dutch, an SOV language, it is generally possible to have PPs in postverbal position ('extraposition').

(22)a. dat de katten in de tuin verstoppertje speelden
that the cats in the garden hide-and-seek played
b. dat de katten verstoppertje speelden in de tuin
that the cats hide-and-seek played in the garden

The only PPs that cannot be extraposed are small clause predicates.

(23)a. dat de katten in de tuin waren
that the cats in the garden were
b. * dat de katten waren in de tuin
that the cats were in the garden

But, surprisingly, if we turn (23) into an expletive construction, the extraposition is fine.[11]

(24)a. dat er veel katten in de tuin waren [=(11b)]
that there many cats in the garden were
b. dat er veel katten waren in de tuin
that there many cats were in the garden

Consequently, the extraposed PP in (24) cannot be a small clause predicate. Hence, something else must be the small clause predicate, and the only candidate is the expletive *er* 'there'.

This hypothesis makes two very clear predictions. If *er* is a raised predicate in (24b), this sentence should have an existential reading only. Secondly, extraposition of PPs that look like small clause predicates should only be grammatical in expletive constructions with unaccusative verbs. Both predications are borne out.

(24b) very clearly has only one reading, the existential reading. With the stress pattern of the presuppositional reading, and with scrambling of the associate NP, the sentence becomes sharply ungrammatical.

(25)a. * dat er VEEL katten waren in de TUIN
that there many cats were in the garden
b. * dat er veel katten gisteren waren in de tuin
that there many cats yesterday were in the garden

Thus, (24b) has one of the properties typical of English expletive constructions discussed in section 1.

The other property of English expletive constructions discussed in section 1 is the restriction to unaccusative verbs. We cannot test this on (24b) directly, as the verb in this construction is unaccusative. What we expect, however, is that PP extraposition remains ungrammatical in expletive constructions with an unergative transitive verb. An unergative transitive verb necessarily assigns an external theta role, hence raising is impossible, and the expletive cannot be a raised predicate. Therefore the PP must be the small clause predicate, and extraposition is expected to be ungrammatical. The relevant example is given in (26)-(27).

(26)a. dat Jan [een boek op de tafel] legde
that Jan a book on the table put
b. * dat Jan [een boek t] legde op de tafel
that Jan a book put on the table

(27)a. dat er iemand [een boek op de tafel] legde
that there someone a book on the table put
b. * dat er iemand [een boek t] legde op de tafel
that there someone a book put on the table

As can be seen, extraposition of the small clause predicate in a construction with a transitive verb does not improve when the construction is turned into an expletive construction. This shows that in Dutch, as in English, expletive constructions that have the specific property of forcing an existential reading can only take unaccusative verbs.

The facts discussed in this section show that there is a considerable overlap between expletive constructions in English and Dutch, despite appearance to the contrary. The type of construction that English and Dutch have in common has exactly the three properties listed in section 1. The facts from Dutch show that in this type of construction, the expletive must be analyzed as a raised small clause predicate. It is the other type of expletive construction in Dutch that has the properties listed in section 2. For this type of construction it must be assumed that the expletive is not a raised predicate, since the existential reading is not forced, and all types of verbs are allowed.

6. Predicates and Adjuncts

The discussion in section 6 clearly supports the expletive raising analysis of Moro (1990), sketched in section 4. Recall, however, that the type of sentence in (29b) posed a potential problem for that analysis.

(28)a. A picture hung on the wall
b. On the wall hung a picture
(29)a. * There hung a picture
b. There hung a picture on the wall

The problem is that by the analysis of Hoekstra & Mulder (1990) on the wall is a small clause predicate in (28) and (29b). In (28b) on *the wall* is a raised predicate, and in both (28b) and (29b) the presence of the locative PP turns *hung* into an unaccusative verb. If *on the wall* is a predicate in (29b), *there* must be an ordinary expletive. On the other hand, if we want to maintain that *there* is a raised predicate, the PP *on the wall* must be an adjunct.

This latter position is taken by Moro (1991b), who provides extensive motivation for the predicate status of *there*, but not as much for the adjunct status of the PP. However, the adjunct status of the PP needs to be empirically supported, especially since this adjunct appears to be obligatory in (29).

Fortunately, the PP extraposition facts from Dutch, discussed in section 5, give us exactly the kind of empirical support we are looking for. Since we know that only adjunct PPs can be extraposed, the extraposed PPs in expetive constructions in Dutch must be adjuncts (see (24b), here repeated as (30)).

(30) dat er veel katten waren in de tuin
that there many cats were in the garden

It is also possible to show adjunct island effects (Moro, pc). First consider English.

(31)a. which room$_i$ did you say that John walked into t$_i$
b. * which room$_i$ did you say that there walked a man into t$_i$

The ungrammaticality of (31) follows from the hypothesis that the PP out of which *which room* is extracted is an adjunct, since adjuncts are islands.

In Dutch, the same effect doesn't immediately show up.

(32)a. welke kamer$_i$ zei je dat Jan t$_i$ in liep
which room said you that Jan into walked
b. welke kamer$_i$ zei je dat er veel katten t$_i$ in liepen
which room said you that there many cats into walked

But this is expected, as Dutch expletives are not always raised predicates, contrary to English expletives. We therefore expect that in (32b), the PP can be the predicate, and the expletive a true expletive. The way to test this is to look at the stress pattern again, and, indeed, the stress pattern for the presuppositional reading of the associate NP is possible (33).[12] So is scrambling of the associate NP (34).

(33) welke kamer zei je dat er VEEL katten *t* IN liepen

(34) welke kamer zei je dat er veel katten gisteren *t* in liepen
yesterday

(33) and (34) show that *er* is not a raised predicate here, and that therefore the PP must be the small clause predicate, which explains the lack of asymmetry in (32). A further problem for detecting adjunct island effects in this type of construction in Dutch is that directional postpositional PPs cannot appear in adjunct position.

(35)a. * dat er die kamer in veel katten liepen
that there that room into many cats walked
b. * dat er veel katten liepen die kamer in
that there many cats walked that room into

Therefore extraction out of the adjunct positions in (35) cannot be tested. Non-directional locative PPs can appear in adjunct position however, as we have seen in (22b). Other examples are in (36).

(36)a. dat er veel foto's in de krant stonden
that there many pictures in the paper stood
b. dat er in de krant veel foto's stonden
that there in the paper many pictures stood
c. dat er veel foto's stonden in de krant
that there many pictures stood in the newspaper

Extraction out of the PP in de krant in (36) gives us the same adjunct island effect as in the English examples (31).[13]

(37)a. waar$_i$ sei je dat er veel foto's t_i in t_i stonden
where said you that there many pictures in stood
b. * waar$_i$ sei je dat er t_i in t_i veel foto's stonden
where said you that there in many pictures stood
c. * waar$_i$ sei je dat er veel foto's stonden t_i in t_i
where said you that there many pictures stood in

So it appears that in cases like (29b) what looks like a small clause predicate PP in reality is an adjunct, allowing extraposition, and showing adjunct island effects.

A funny thing about this adjunct PP remains its obligatoriness in (29). The following scenario could make sense. Suppose that all that the there predicate contributes to the meaning of a clause is that its subject is said to exist. We know that certain verbs (e.g. hang) can only be unaccusative if their complement is a small clause with a locational predicate (Hoekstra & Mulder 1990). There itself is not locational, which explains the ungrammaticality of (29a).

(29a) * There hung a picture

In (29a), the verb is not unaccusative, so that raising of the small clause predicate is impossible. Suppose, however, that the small clause predicate is accompanied by a locational adjunct PP. In that case, the meaning of the sentence would be that the subject of the small clause not just exists, but exists in a certain location. Let us assume that this comes close enough to the small clause predicate actually being locational, turning the unergative verb into an unaccusative verb. Assuming that the technical details could be worked out, this would account for the obligatory presence of the locational adjunct PP in sentences like (29b).

(29b) There hung a picture on the wall

7. Summary and Conclusions

We found evidence above that a certain class of expletive constructions in Dutch has exactly the properties that all expletive constructions in English have. In these constructions, an existential reading of the associate NP is forced, and only unaccusative verbs are allowed. We also found support in the Dutch facts for the predicate raising analysis of expletive constructions, considering that these constructions feature small clauses and that what looks like the small clause predicate is really an adjunct.

The next question, which space does not permit me to extensively answer, concerns the analysis of the residue of the expletive constructions in Dutch. These constructions lack the properties of English expletive constructions. A presuppositional reading of the associate NP is possible, and the constructions allow all kinds of verbs (see section 2).

In these constructions, *er* cannot be a raised predicate, but looks like a true expletive in the sense of Chomsky (1986a,1989). If this is correct, we may assume that this expletive has to be replaced at LF, yielding a structure as in (19). As argued above, the structural properties of this adjunction construction appear to allow two readings, one where the expletive takes scope over the associate and another one vice versa. This is exactly the structure that would account for the ambiguity of Dutch expletive constructions found in section 2.

To conclude, both analyses of expletive constructions considered in this article appear to be justified. However, they have a different scope than had previously been assumed. The expletive raising analysis holds for all English expletive constructions, and for part of the Dutch expletive constructions. The expletive replacement analysis holds for a residue of the expletive constructions in Dutch, but not for English at all.[14]

FOOTNOTES

* Thanks to Helen de Hoop, Howard Lasnik, Andrea Moro, René Mulder, and Eric Reuland, and to the audience at ESCOL VIII. Presentation of this paper at ESCOL was made possible by a grant from the Netherlands Organization for Scientific Research (NWO).

1. The two readings can also be distinguished in terms of proportionality/cardinality (cf. Partee 1988). Thus, *many men* in (6a) can either mean 'a great number of men' or 'many of the men', the latter being the proportional reading, which is absent in (6b). See Higginbotham (1987) for use of the term 'situation' in the paraphrases.
2. Note that Dutch, being an SOV language, has the direct object preceding the past participle, whereas in English, an SVO language, the relevant example (3b) must have the participle preceding the direct object. The construction *there was a man arrested* is presumably closer to constructions of the type *there was a man sick* than to the Dutch example (10b) (cf. Moro 1991a, Zwart 1991). Note that the VO-OV distiction cannot explain the difference between expletive passives in Dutch and English, as the Scandinavian languages, all SVO languages, pattern with Dutch in this respect (see Vikner 1991).
3. Similarly, both (11a) and (11b) allow the proportional reading of *veel katten*, sc. 'many of the cats'.
4. Judgments are mine. De Hoop considers (14a) to be better and (14b) to be worse (cf. (19) in De Hoop 1990).
5. In his 1991 Fall term class lectures, Chomsky assumes that movement can only take place for reasons of licensing of morphological properties, such as Case licensing. This movement can take place at S-structure as well as at LF. In expletive constructions, the associate moves and adjoins to the expletive at LF for reasons of Case licensing, while the expletive is being considered a legitimate LF object all along. I will not go into this version of the analysis here, but see Zwart (to appear).
6. This is a general property of adjunction constructions. An element α c-commands ß iff α does not dominate ß and every γ that dominates α dominates ß (Chomsky 1986b:8), where no α dominates ß unless all segments of α dominate ß (May 1985, Chomsky 1986b:7).
7. Except, potentially, when expletive replacement doesn't take

place to make the expletive legitimate, but to license the associate, see note 5.

8. For this we would have to assume that unaccusative verbs like *arrive* take a small clause complement as well.

9. In this analysis it is assumed that Case assignment to the associate takes place in an indirect way, via the raised predicate and its trace to the small clause subject (Hoekstra & Mulder 1990), so nothing forces adjunction of the associate to the expletive. As to the meaning of the 'expletive predicate', it just predicates existence of the subject of the small clause (René Mulder, pc).

10. This may also explain the stress pattern facts, assuming that destressing of the NP take place when the NP refers to given information (as suggested by Chris Tancredi, pc), hence when the NP is specific. In that case, only the quantifier will be stressed, whereas when the NP is stressed it refers to new information and the existential interpretation becomes possible.

11. Thanks to René Mulder for bringing this to my attention.

12. The stress pattern of the existential reading is also possible in (32b). This does not show that the expletive is a raised predicate, however, because it cannot be assumed that in Dutch an existential interpretation is only then possible when the expletive is a raised predicate. For instance, expletive constructions with postpositional PPs (which cannot be extraposed) also allow an existential reading, but here the expletive cannot be a raised predicate. Cf.

(i) dat er veel KATTEN de tuin in liepen
that there many cats the garden into walked
(ii) *dat er veel katten liepen de tuin in
that there many cats walked the garden in

13. Extraction out of prepositional PPs is only grammatical if the movement goes through [Spec, PP], which is only possible if the extracted element is a pronominal with the feature [+R], (Van Riemsdijk 1978).

14. This leaves open the question why English and Dutch differ in this respect. At present, I have nothing but speculations to offer, so I will leave the issue aside. See Zwart (to appear).

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